

Sankyo

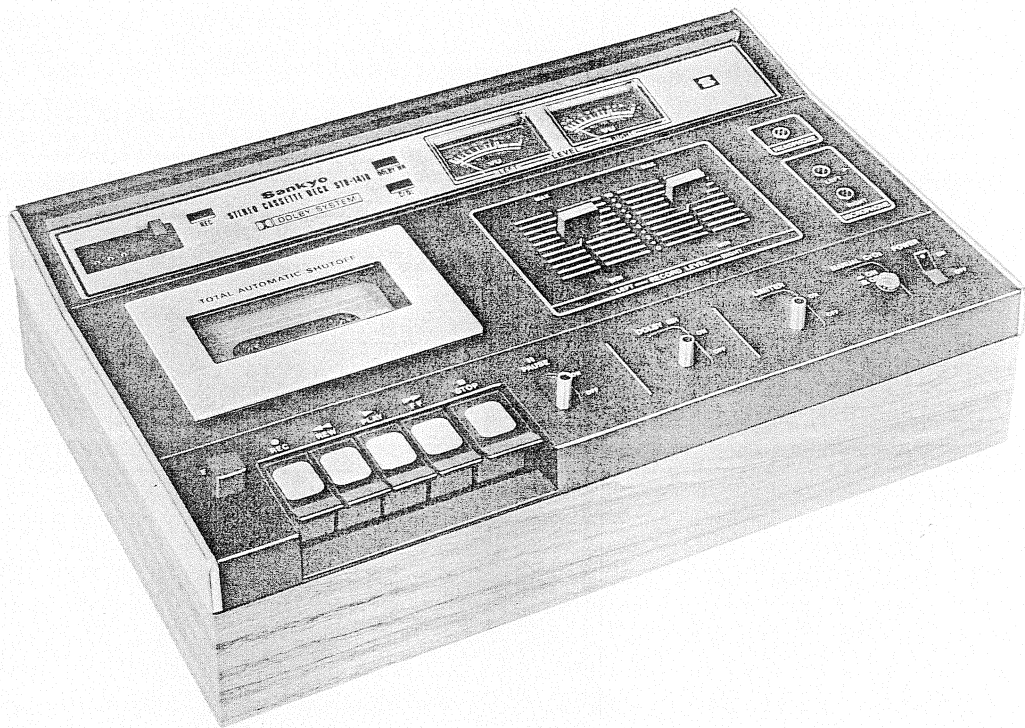
STEREO CASSETTE DECK

MODEL

STD-1410

WITH DOLBY IC CIRCUIT

Service Manual-Parts List



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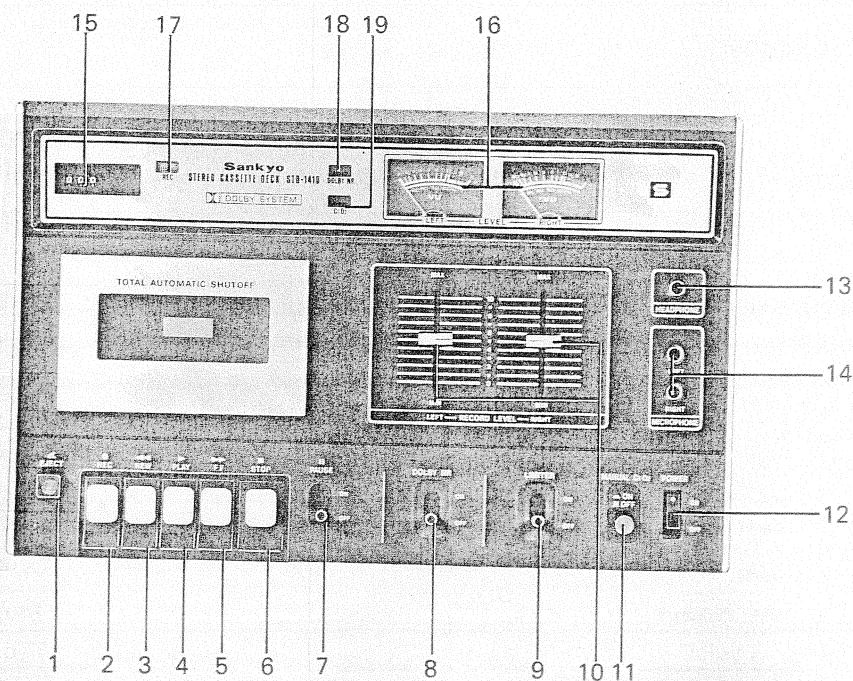
1. SPECIFICATIONS

Type	: Philips cassette tape 2-channel stereo/mono
Power requirement	: UL, CSA; AC 120V, 60Hz VDE; AC 230V, 50Hz SEMKO, NEMKO, DEMKO, FEMKO, SEV; AC 220V, 50Hz (North European type)
Power consumption	: UL, CSA: AC 9W VDE; AC 9W SEMKO, NEMKO, DEMKO, FEMKO, SEV; AC 9W (North European type)
Dimensions	: 380mm(W) x 83mm(H) x 240mm(L)
Weight	: 3.5 kg
Cassette	: C-30, C-60, C-90, C-120
Tape speed	: 4.75 cm/sec
Fast forward time	: Less than 120 sec (with C-60)
Rewind time	: Less than 120 sec (with C-60)
Recording time	: 120 min (C-120)
Recording system	: AC bias, 80kHz
Erasing system	: AC erasing
Terminals	: LINE IN 350mV (20k Ω) Microphones 0.15 μ V (600 Ω) LINE OUT 0.58V (10k Ω) Headphones 8 Ω DIN terminal
Wow and flutter	: Less than 0.15% WRMS
Signal to noise ratio	: 55dB (CrO ₂ Tape/Dolby NR ON with filter)
Frequency response	: 40 to 14,000Hz
Distortion	: 2.5%
Subfunctions	: Manual CrO ₂ /NORMAL switch Dolby NR switch (with indicator lamp) Total automatic shut-off mechanism Limiter recording switch 3-Digit tape counter Pause switch
Semiconductors	: Transistors 12 ICs 4 Diodes 12
Standard accessories	: Head cleaning kit 1 Stereo connection cords (Pin-type)
Printed papers attached	: 1 for UL (1 for VDE)
Guarantee card	: 1

Note: For improvements, design and specifications subject to change without notice.

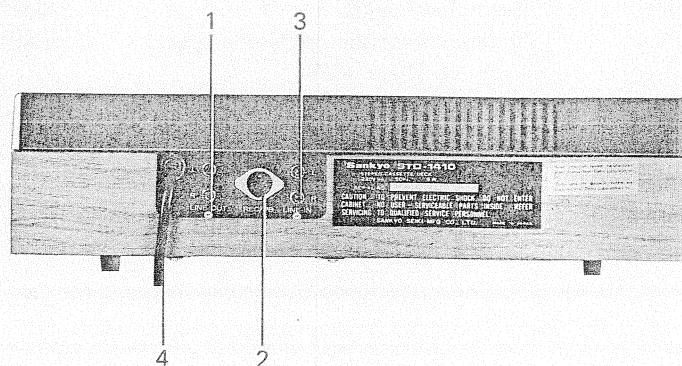
2. PARTS IDENTIFICATION

2.1 Control Panel



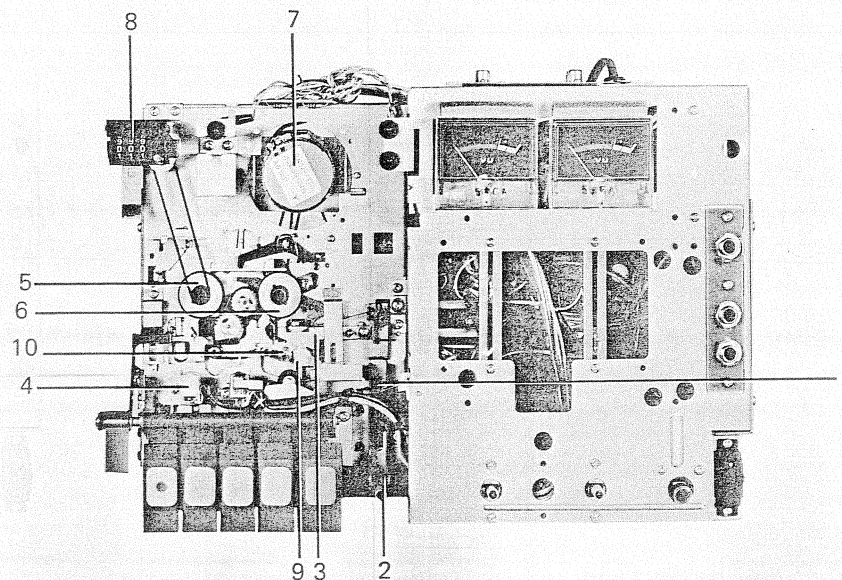
- | | |
|-------------------------------|-------------------------|
| 1. Eject button | 17. Recording indicator |
| 2. Record button | 18. Dolby NR indicator |
| 3. Rewind button | 19. CrO2 indicator |
| 4. Play button | |
| 5. Fast forward button | |
| 6. Stop button | |
| 7. Pause switch | 12. Power switch |
| 8. Dolby NR switch | 13. Headphone jack |
| 9. Limiter switch | 14. Microphone jacks |
| 10. Playback level controls | 15. Tape counter |
| 11. Manual CrO2 select switch | 16. VU meters |

2.2 Connection Panel



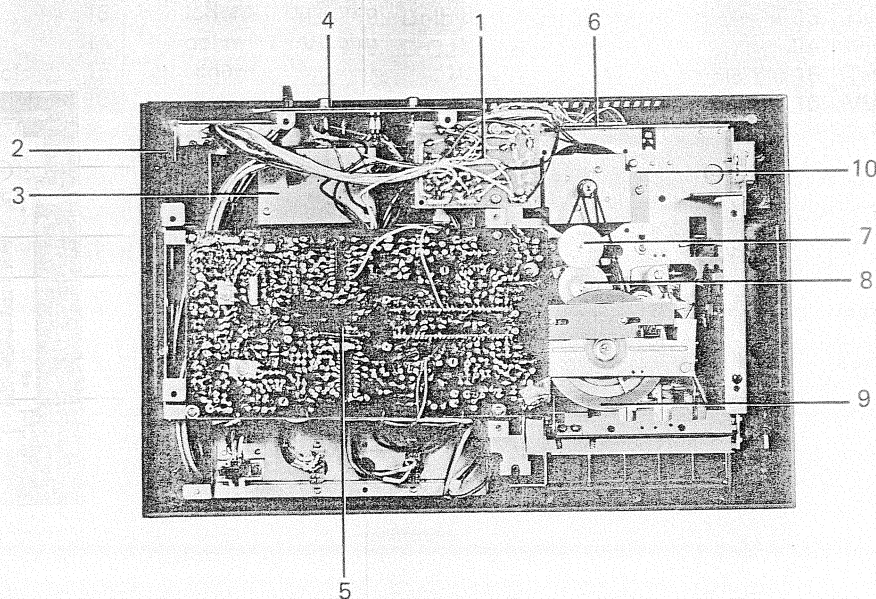
1. LINE OUT jacks
2. REC/PB (DIN) jack
3. LINE IN jacks
4. Power cord

2.3 Inside Top View



- | | | |
|--------------------------|-----------------|-----------------|
| 1. Muting switch | 5. Supply reel | 8. Tape counter |
| 2. Pause switch lever | 6. Take-up reel | 9. Pinch roller |
| 3. Pause switch assembly | 7. Motor | 10. Capstan |
| 4. Head assembly | | |

2.4 Inside Bottom View

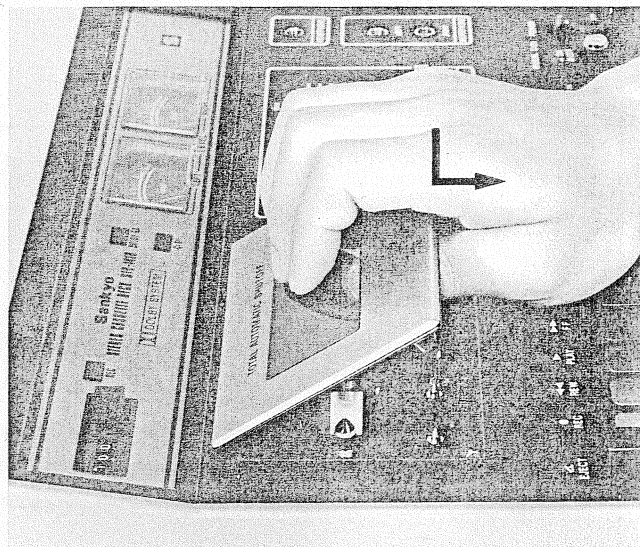


- | | |
|-------------------------------------|---------------------------------|
| 1. Power circuit board | 6. Indicator lamp circuit board |
| 2. Power transformer | 7. Shut-off mechanism |
| 3. Power intermediate circuit board | 8. Tension pulley |
| 4. Terminal board | 9. Flywheel |
| 5. Amplifier printed circuit board | 10. Motor |

3. DISASSEMBLY

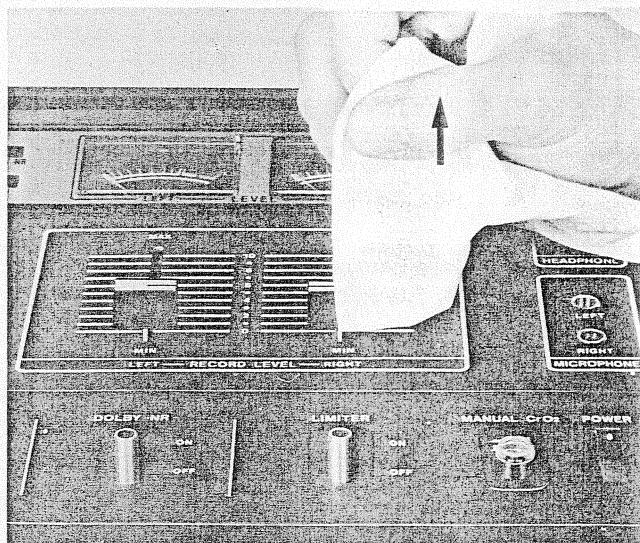
3.1 Removal of the cassette door

Open the door by pressing the eject button
Pull it forward while pressing downward
When it snaps out of the bearing, lift the
right side while pressing to the left.



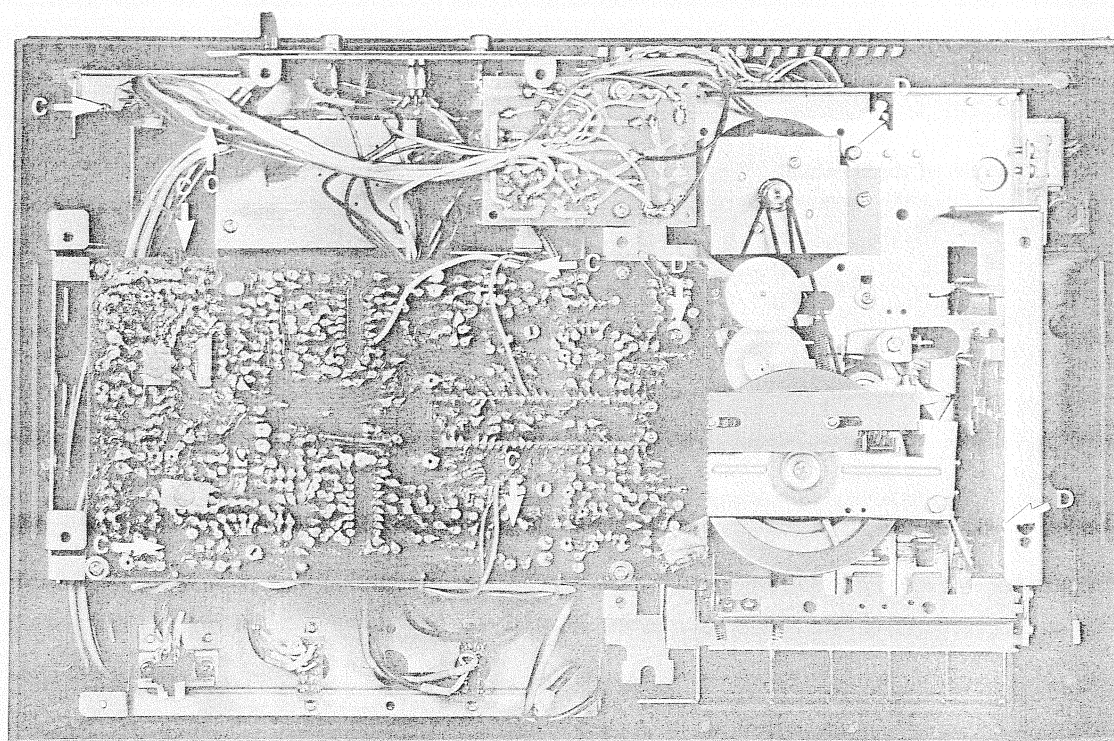
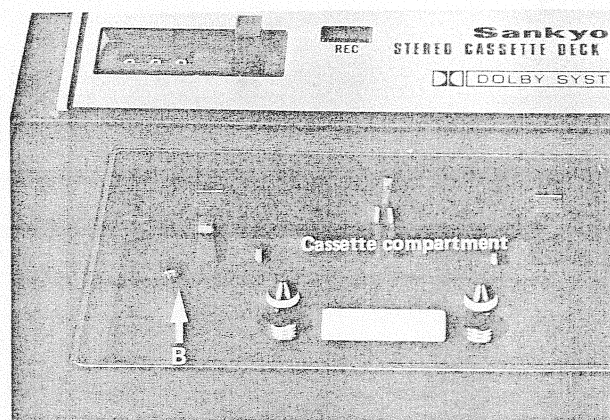
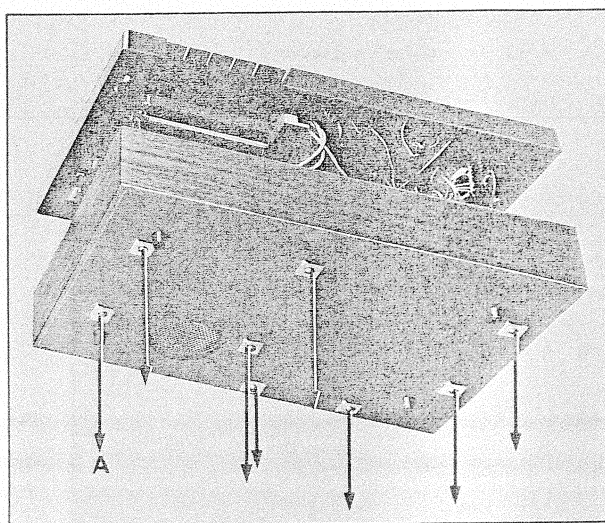
3.2 Removal of the level control knob

Grasp the knob and pull it straight up. If
it is too tight to be pulled out, insert a piece
of cloth underneath and pull the cloth
at right angles to the deck surface with enough
force.



3.3 Separation of the chassis from the cabinet

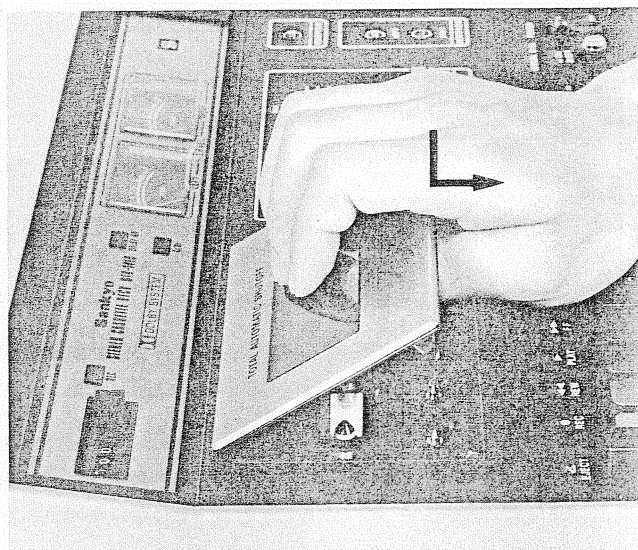
Loosen 8 screws (A) at the bottom of the cabinet and remove the lower case. Loosen screw (B) in the cassette compartment. Loosen 6 screws (C) on the amplifier section and 3 screws (D) on the tape transport mechanism section. (If the guard shield is provided on the circuit board, it must be removed first by loosening 4 screws (E) holding the circuit board. Then two of the screws (C) and one of the screws (D) are accessible.) Gently lift the chassis straight up.



3. DISASSEMBLY

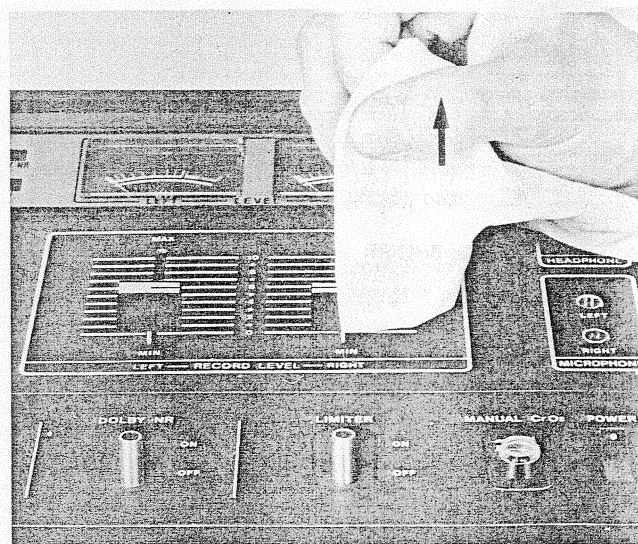
3.1 Removal of the cassette door

Open the door by pressing the eject button.
Pull it forward while pressing downward.
When it snaps out of the bearing, lift the right side while pressing to the left.



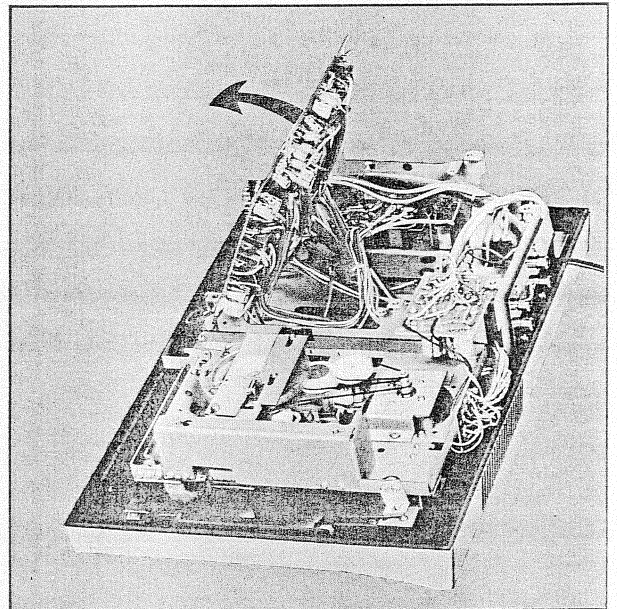
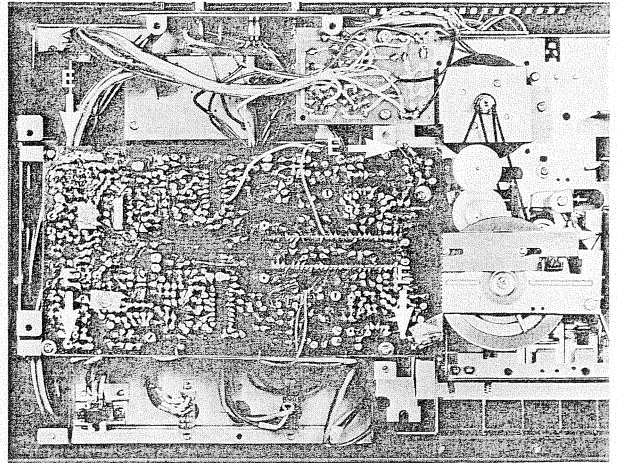
3.2 Removal of the level control knob

Grasp the knob and pull it straight up. If it is too tight to be pulled out, insert a piece of cloth underneath and pull the cloth at right angles to the deck surface with enough force.



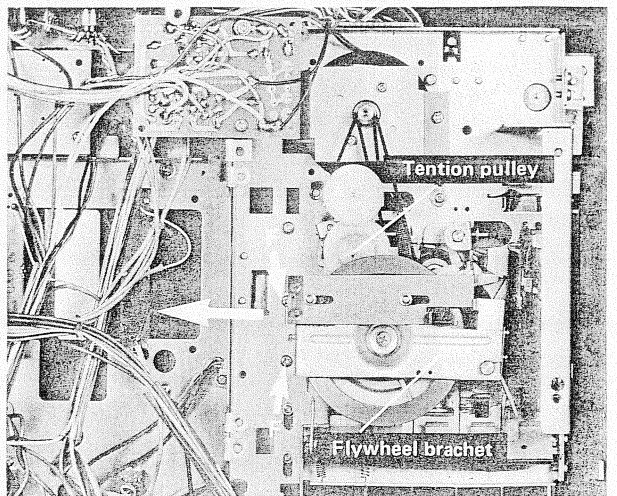
3.4 Removal of the amplifier printed circuit board

Loosen 4 screws (E) on the printed circuit board and swing it forward so you can see all components and connections.



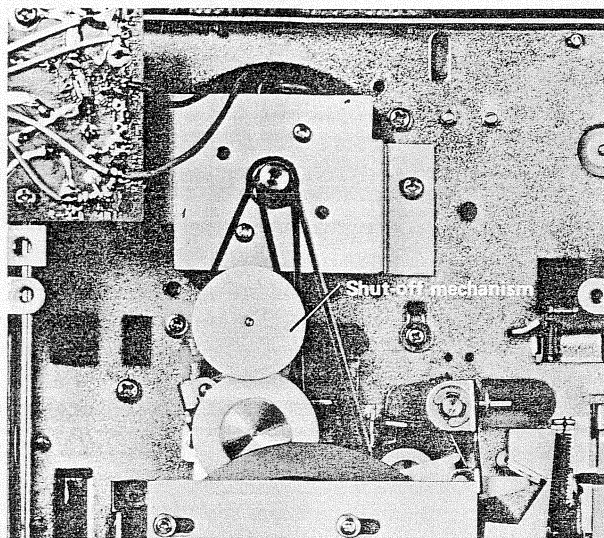
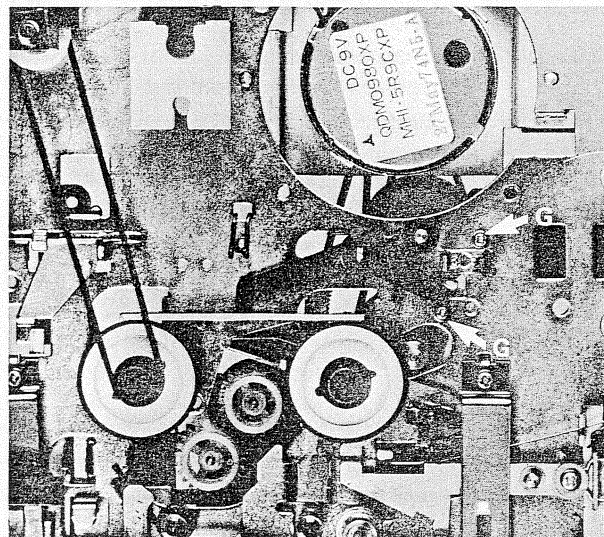
3.5 Removal of the flywheel

Remove the amplifier circuit board. Loosen 2 screws (F) on the flywheel bracket and pull out the bracket sideways while swinging it back and forth. Then remove the belt and move the tension pulley to one side. Remove the flywheel by lifting it.



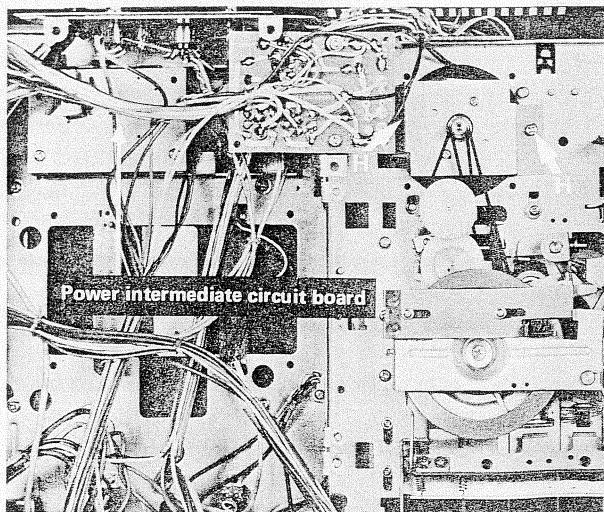
3.6 Removal of the shut-off mechanism

Loosen 2 screws (G). Turn the chassis upside down. Disengage the lever of the shut-off mechanism from the link and pull out the mechanism. (To remove the shut-off mechanism, the belt and amplifier circuit board must be removed first.)



3.7 Removal of the motor

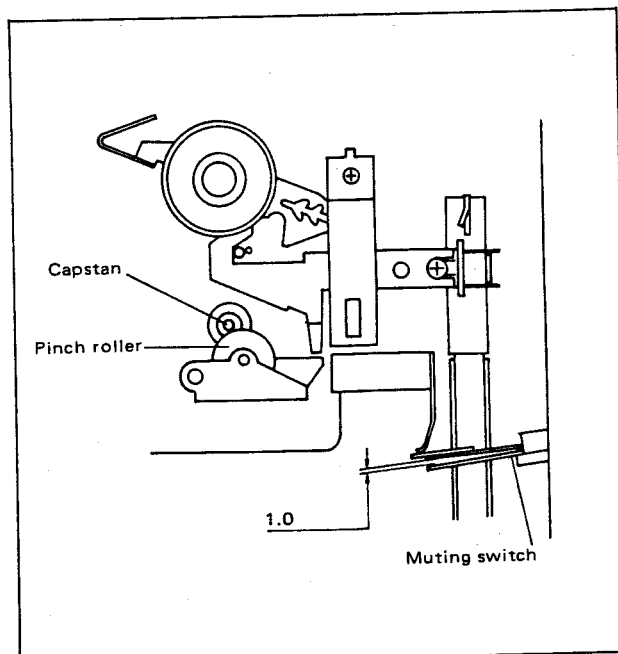
The motor can be removed with the top control panel in place. Loosen 2 screws (H) and pull the motor out. As the motor lead wires are soldered to the power intermediate circuit board located underneath the right channel VU meter, this circuit board should be removed first. To do this, loosen 2 screws on the board.



4. MECHANICAL ADJUSTMENT

4.1 Muting switch

When the play button is pressed, the muting switch leaf contacts should begin to separate at a point where the distance between pinch roller and capstan is 1.5mm in the course of the movement of the head base plate. The contacts should be more than 1mm away from each other when the play button is fully pressed.

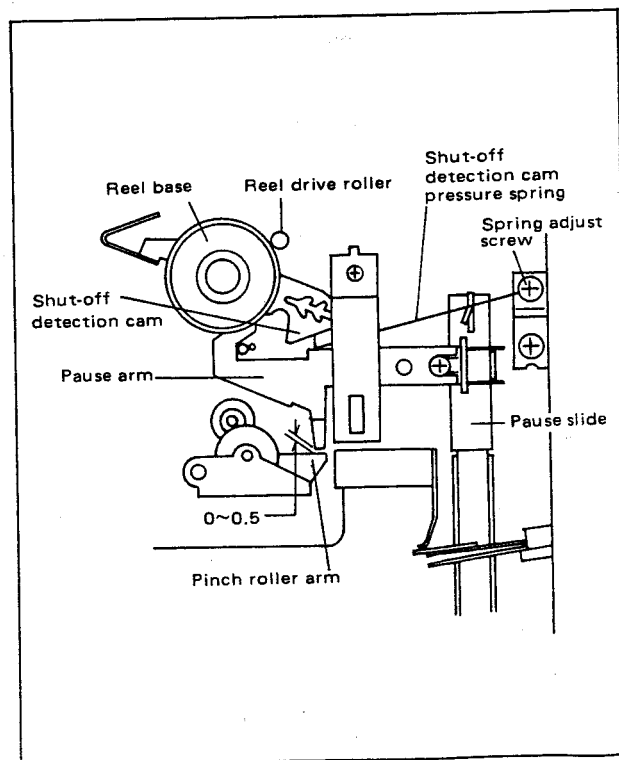


4.2 Pause switch timing

When the pause switch lever is pushed to ON, the pinch roller should separate from the capstan before the reel drive roller separates from the reel disc. Also, the shut-off detection cam pressure spring should exert sufficient pressure against the detection cam. Confirm this with the detection pin engaged in the cam groove.

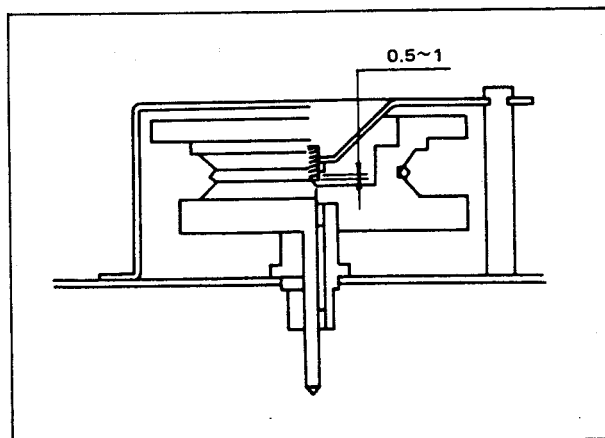
When the pause switch lever is in its OFF position, there should be sufficient space between the pressure spring and the shut-off detection cam.

If it is necessary to adjust the relation between the pinch roller and reel drive roller, press the projecting part of the pause arm downward so as to straighten the bend (the clearance between this projecting part and the pinch roller arm should be 0–0.5mm). To adjust the cam pressure spring, loosen the spring adjust screw and find the optimum position of the spring. Then retighten the screw.



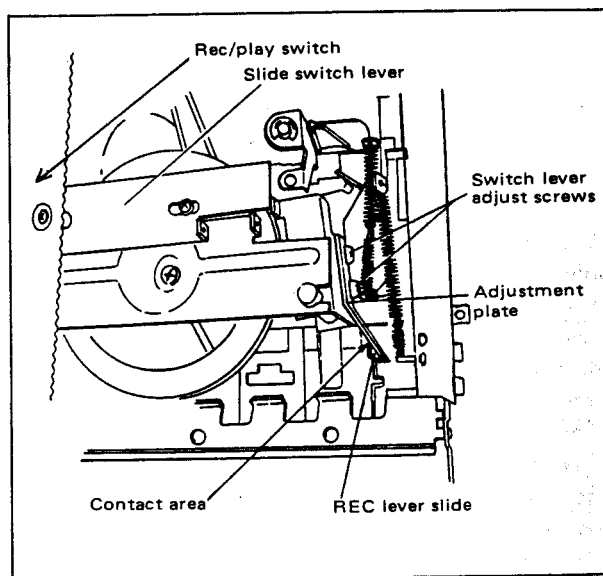
4.3 Flywheel thrust adjustment

Turn the thrust screw on the flywheel bracket with a screwdriver to adjust the clearance to 0.5–1.0mm. After adjustment, seal the screw so it will not move.



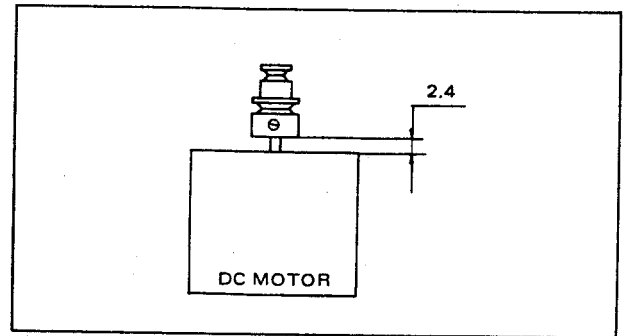
4.4 Record/play switch lever

Make sure that the slide switch lever presses fully against the record/play switch when the REC lever is locked. Then loosen the two screws indicated and move the adjustment plate so as to bring it into contact with the tip of the REC lever slide. Retighten the screws. Grease the contact area.



4.5 Motor pulley position

The clearance between the motor and pulley should be 2.4mm.



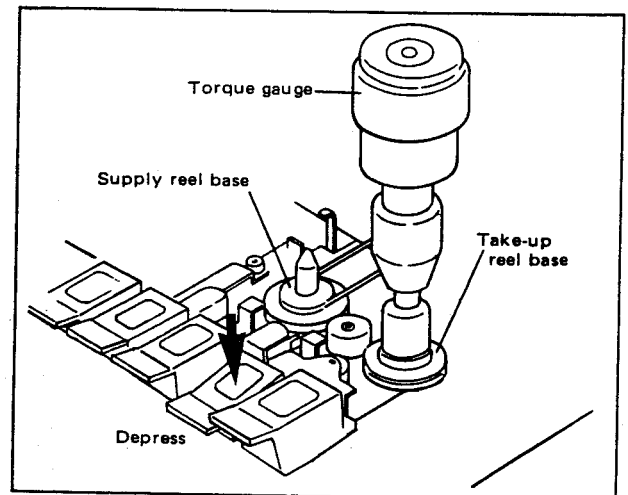
4.6 Reel base torque

Reel base torque should be as follows:

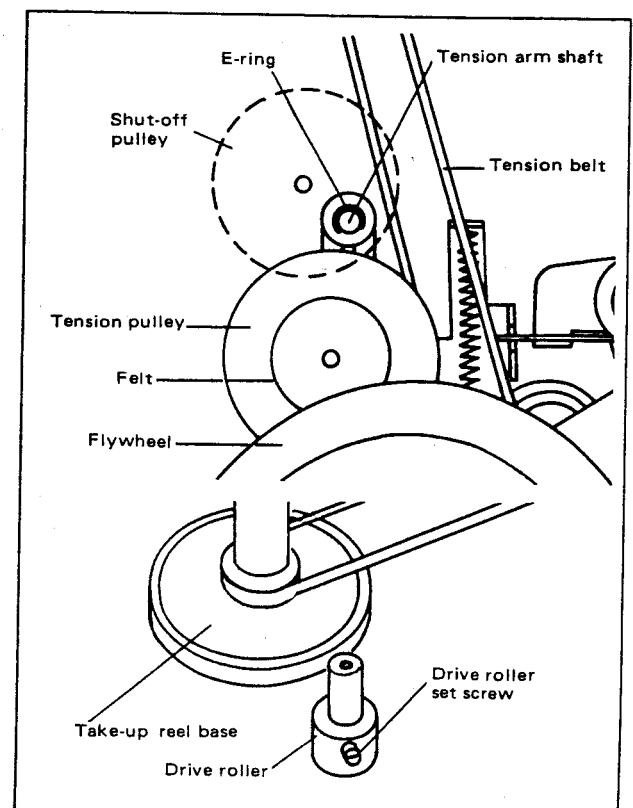
Take-up reel base: 35–70g.cm at PLAY

40–90g.cm at FF

Supply reel base: 40–90g.cm at REW

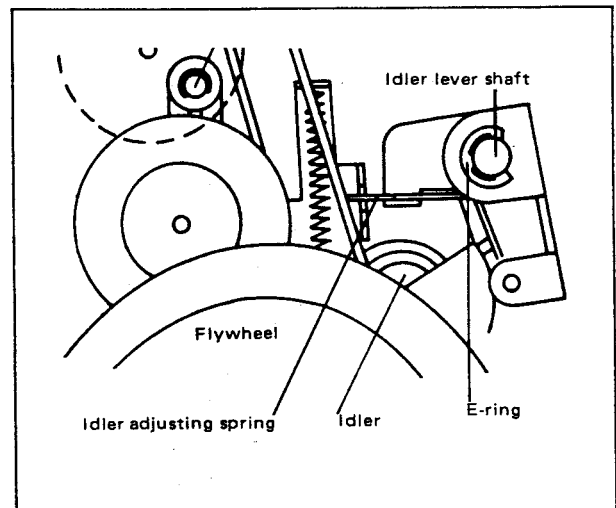


- (1) If the take-up torque at PLAY is not correct, first make sure that the drive roller set screw is not loose. If there is oil adhering to the rim of the reel base, wipe it away carefully. If the torque is still incorrect, see whether oil has penetrated the friction felt of the tension pulley. This could cause slipping. In such a case, replace the tension arm assembly. To remove the tension arm assembly, remove the E-ring on top of the tension arm shaft and lift the assembly. (The belt and flywheel must first be removed.)



- (2) If the reel base torque at FF and REW is not correct, bend the idler adjusting spring inward so that the idler easily engages with the flywheel, increasing the contact pressure between the flywheel and idler tire. If the torque is still incorrect, replace the idler lever assembly. To remove it, remove the E-ring on the idler lever shaft and lift the assembly.

Flywheel
Idler adjusting spring



4.7 Wow and flutter improvement

Make sure that the tension belt is not twist.

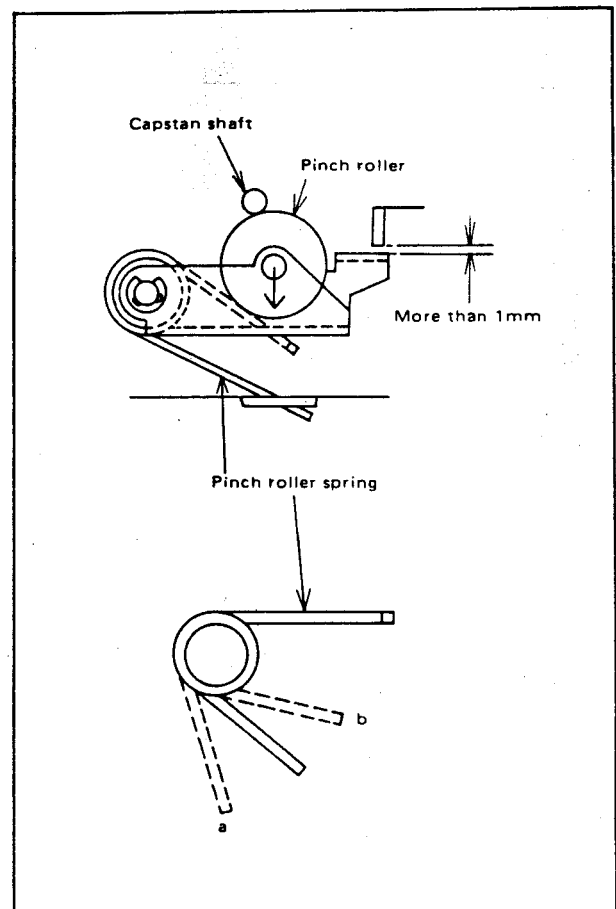
Clean the belt with alcohol.

If the wow and flutter is still not good, replace the belt.

4.8 Pinch roller pressure

Measure the pinch roller pressure with a contact pressure gauge as follows: Pull the pinch roller away from the capstan shaft in the direction of the arrow shown to stop its rotation and return it toward the capstan gradually. Read the gauge just when the pinch roller begins to rotate.

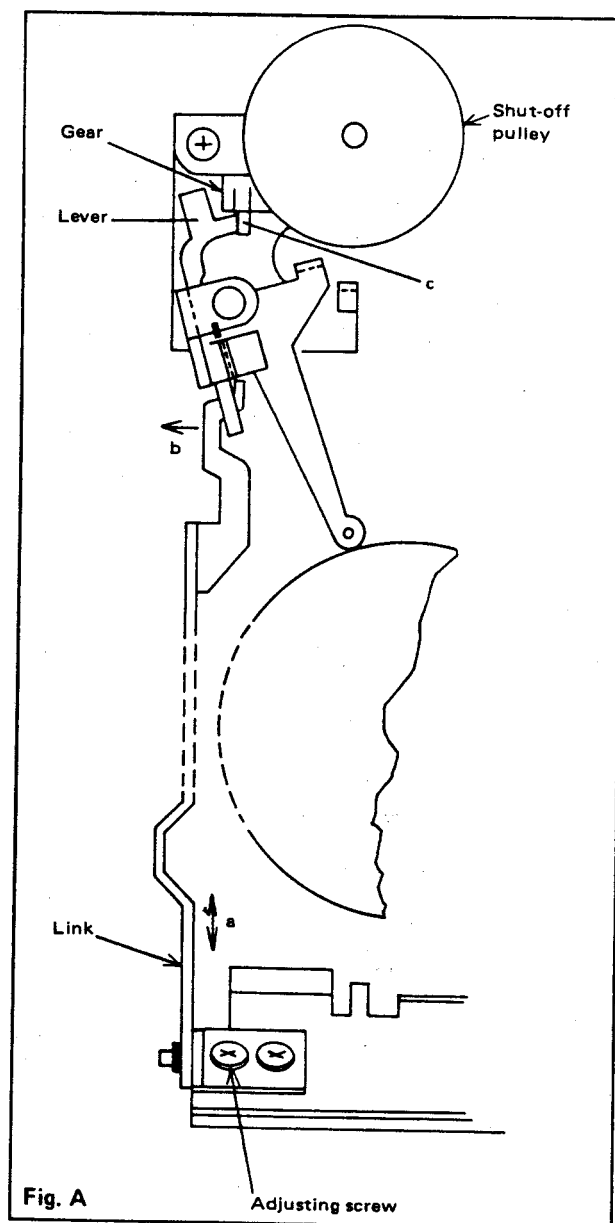
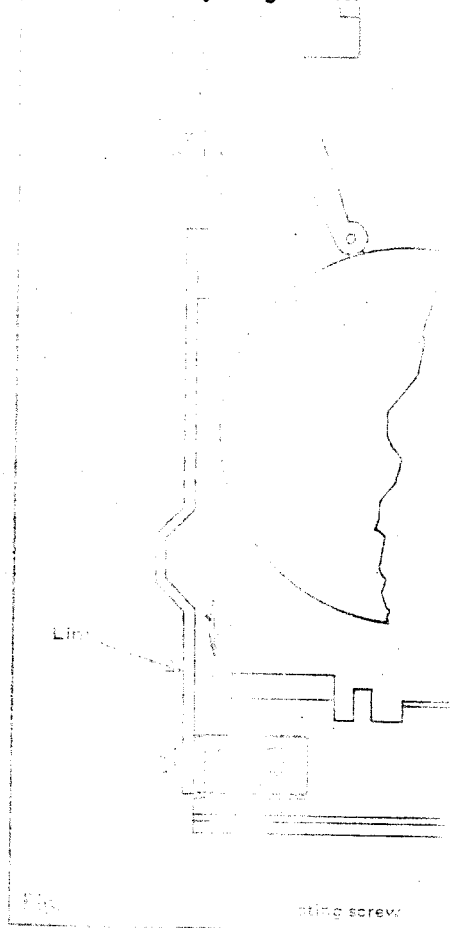
The pinch roller pressure has been adjusted to 300–450g by the shape of the pinch roller spring. If the gauge reading is out of this range, change the shape of the pinch roller spring by pulling it toward (a) when a greater pressure is wanted and pushing it toward (b) when a smaller pressure is wanted.



4.9 Shut-off mechanism

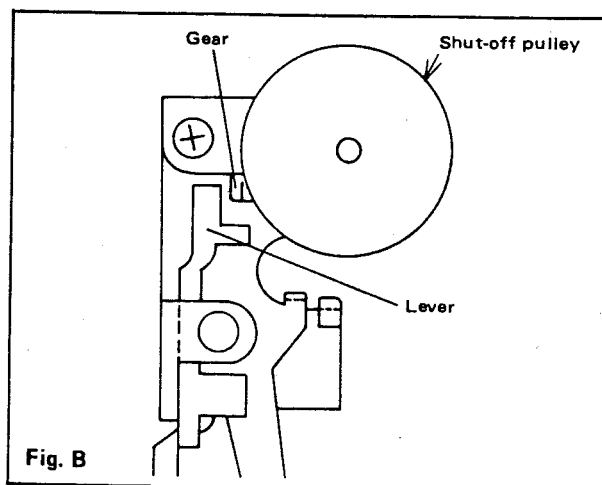
(1) Adjusting the link allowance

Turn and locate the shut-off pulley so that the gear tooth (c) moves the lever to its farthest position as shown in Fig. A. Keeping the link in the direction of the arrow (b), adjust the link allowance along the direction of the arrow (a) to 0.1–0.5mm with the adjusting screws.



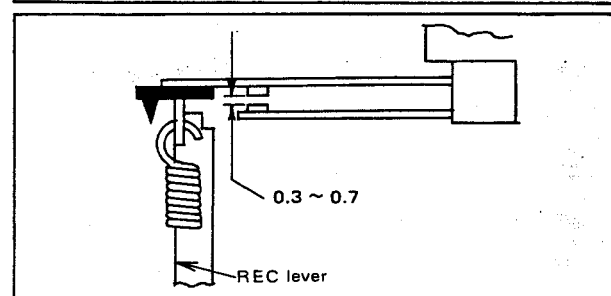
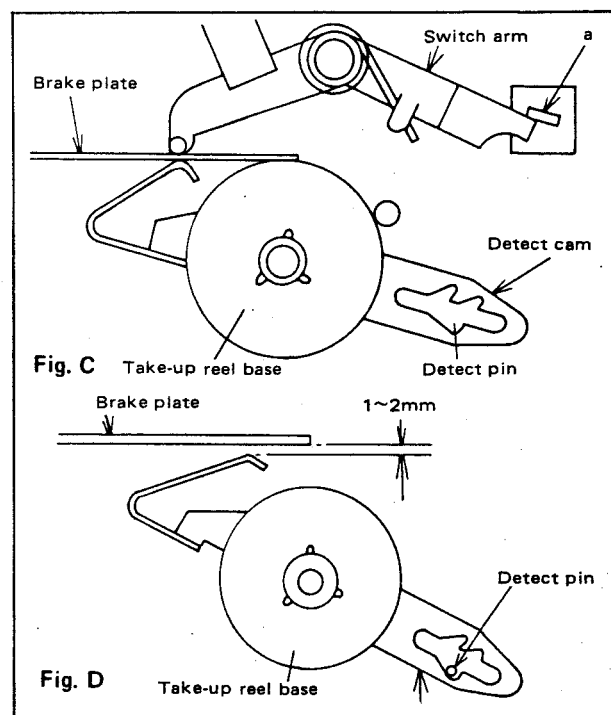
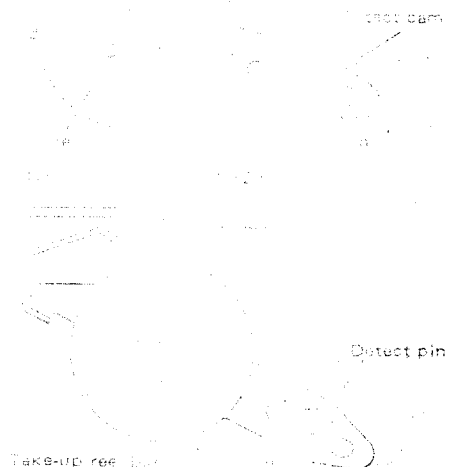
(2) Adjusting the detect pin position

Turn and locate the shut-off pulley so that the gear tooth (c) is not in contact with the lever as shown in Fig. A. Setting the button to the STOP mode (Fig. B), adjust the detect pin position by changing the shape of member (a) so that the pin is in the slot of the detect cam as shown in Fig. C.



(3) Adjusting the detect cam

Setting to the condition shown in Fig. B and to the REW mode, adjust the clearance between the brake plate and the detect cam to 1–2mm when the pin engages with the cam as shown in Fig. D.



4.11 Record switch (DIN)

When the REC lever is locked, the clearance between the contacts of the leaf switch for DIN REC/PB should be 0.3 – 0.7mm.



4.12 Checking

After mechanical adjustment, load a cassette tape and check the following points:

Mode of tape deck	PLAY (▶) button	FF (▶▶) button	REW (◀◀) button	STOP (■) button	REC (●) button	EJECT (▲) button
Stop	○	○	○	—	○	○
Record	—	○	○	○	—	×
Fast Forward	○	—	○	○	○	○
Rewind	○	○	—	○	○	○
REC button engaged	○	○	○	○	—	○
Playback	—	○	○	○	×	×
PAUSE	○	○	○	○	○	○

○ Locking of button should be possible.

× Locking of button should be impossible.

4.13 Cleaning

After mechanical adjustments clean the following parts by wiping with cloth soaked with alcohol or cleaning solution specially prepared for this purpose: belt, idler, tires of the reel bases, pinch roller, capstan and contact surface of the flywheel.

Be careful not to use cleaning agents other than alcohol or cleaning solution mentioned above.

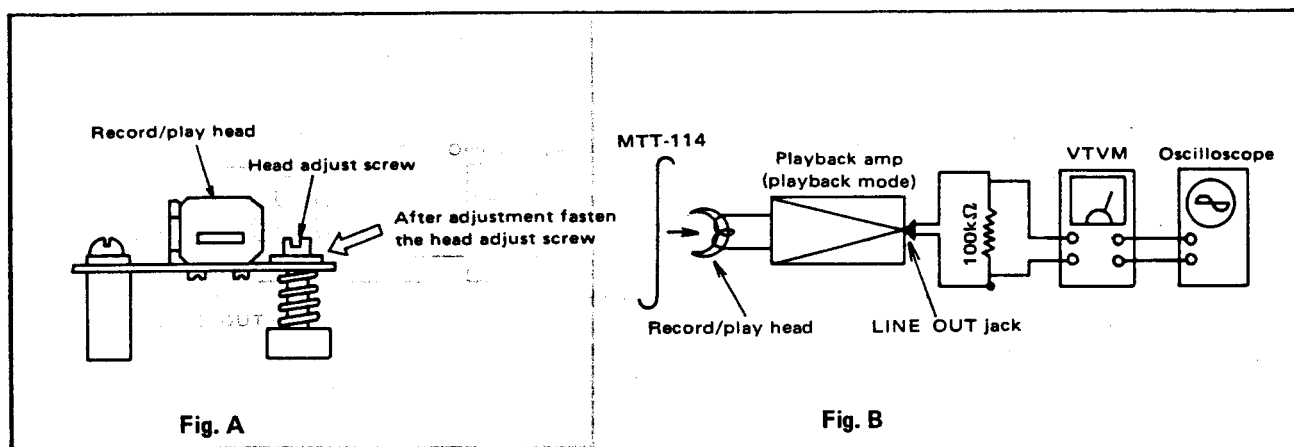
5. ELECTRICAL ADJUSTMENT

5.1 Head position

The record/play head and erase head must be located so that the center of the pinch roller, the center of the record/play head tape guide and the center of the erase head tape guide are on the same line. The heads also must face forward correctly.

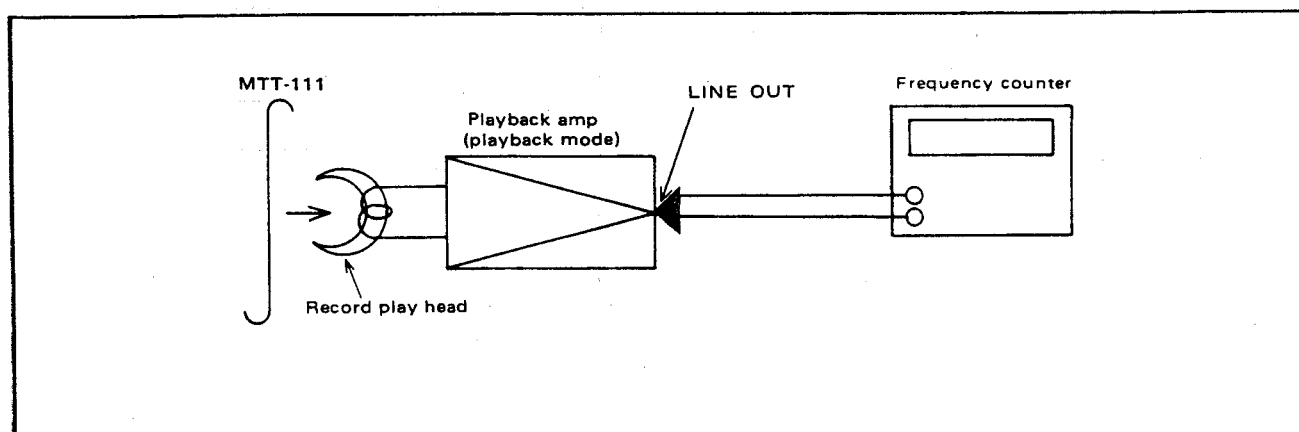
Adjusting the head azimuth:

- Set the playback level controls to their maximum positions
- Play back a recorded 10kHz test tape (MTT-114)
- Connect a dummy resistor (1/4W 100k Ω $\pm$ 5%) to the LINE OUT jack
- Connect a valve voltmeter and oscilloscope across the dummy resistor as shown in Fig. B
- Adjust the head's angle with the head adjusting screw so that the reading of the valve voltmeter becomes maximum for both channels
- When adjusting the head's angle, make sure that a sine wave is displayed on the oscilloscope. If the wave form is distorted, correct measurement cannot be done. Adjust the level controls so that the correct wave form is projected.
- After adjusting, tighten the screw (Fig. A)



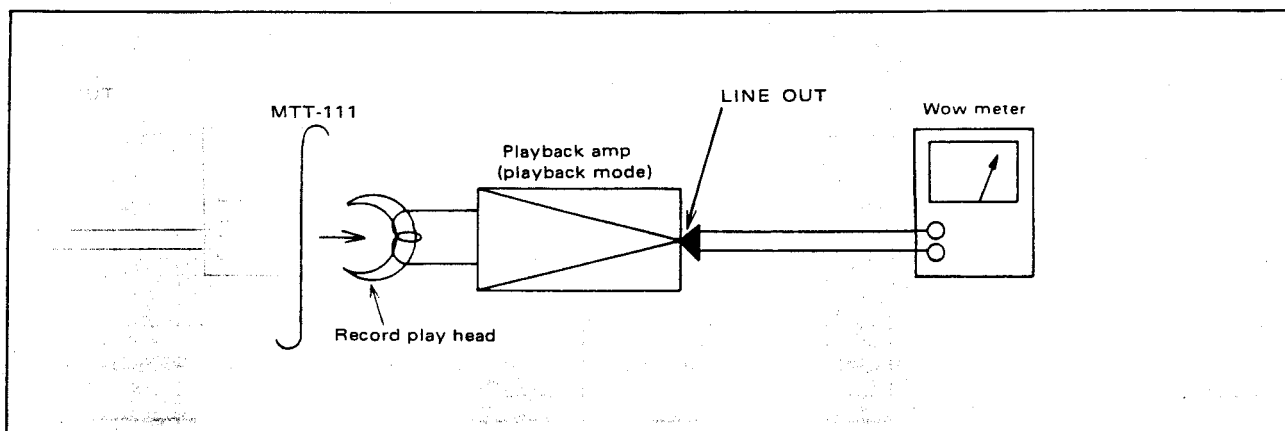
5.2 Tape speed

- Set the switch and controls as follows:
 - Power switch ON
 - Playback level controls to a position where the frequency counter operates best
- Play back the test tape (MTT-111) on which a 3kHz signal is recorded.
- Connect a frequency counter to the LINE OUT jack. The tape speed is normal if the readings on the frequency counter are 3,000 $\pm$ 90Hz at both end portions of the test tape.
- If the reading is outside these limits, check the pinch roller pressure and flywheel thrust or clean the belt. When the reading is still outside the limits, replace the motor pulley or motor.



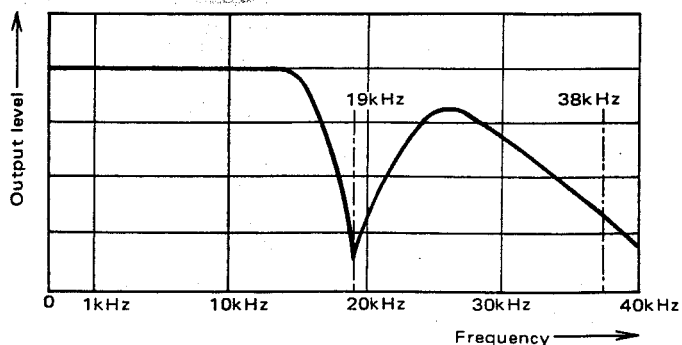
5.3 Wow and flutter

- (1) Set the switch and controls as follows:
 - a) Power switch ON
 - b) Playback level controls to MAX
- (2) Play back the test tape (MTT-111) on which a 3kHz signal is recorded.
- (3) Connect a wow meter to the LINE OUT jack. The wow and flutter is normal if the reading on the wow meter is less than 0.15% WRMS at both end portions of the tape.
- (4) If the reading is outside these limits, check the pinch roller pressure, flywheel thrust, belt extension and forward torque.
If the reading is still outside the limits, replace the motor.



5.4 MPX filter

Set the recording level control resistors R115 (left channel) and R215 (right channel) at maximum. Put the set in the record mode. Apply a signal of 1kHz to the LINE IN terminals so that an output of 500mV is present at the LINE OUT terminals. While varying the input frequency, adjust L102 (left channel) and L202 (right channel) so that the response drops at 19kHz.



5.5 VU meters

Set the recording level control resistors R115 (left channel) and R215 (right channel) at maximum. Put the set in the record mode. Apply a signal of 400Hz to the LINE IN terminals so that an output of 580mV is present at the LINE OUT terminals. In this state, adjust R135 (left channel) and R235 (right channel) so that the meter indicators point out to the Dolby mark (D).

5.6 Playback level

Set the playback level control resistors R127 (left channel) and R227 (right channel) at maximum and play back a test tape MTT-150. Adjust R109 (left channel) and R209 (right channel) so that an output of 580mV is present at the output terminals.

5.7 Recording and playback level

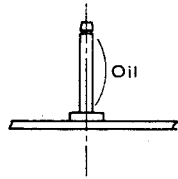
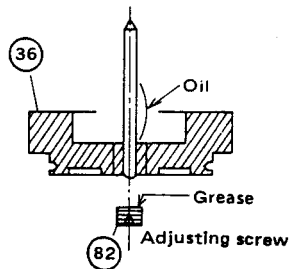
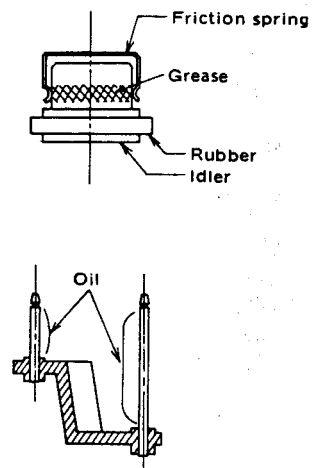
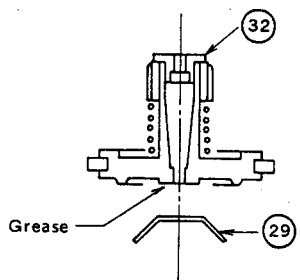
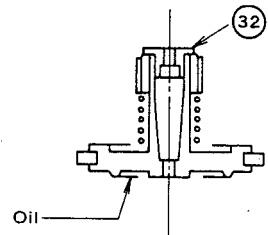
This adjustment should be done after the adjustment mentioned in 5.6.

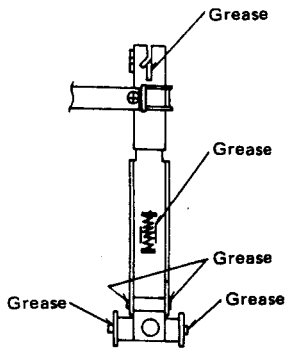
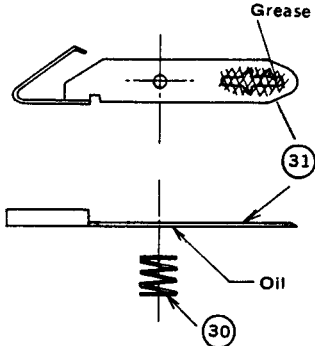
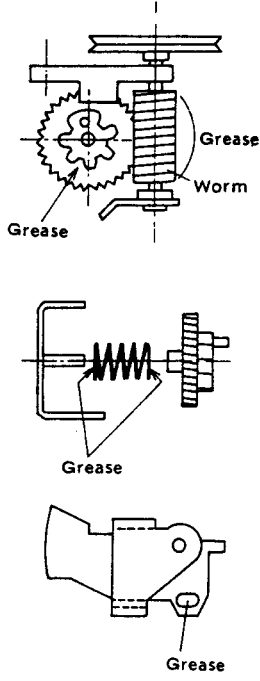
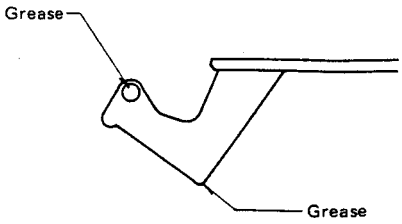
Set the playback level control resistors R127 (left channel) and R227 (right channel) at maximum and apply an input (400Hz) which gives an output of 500mV at the LINE OUT terminals. Select R136 – R139 (left channel) and R236 – R239 (right channel) so that the playback output is certain to be $500\text{mV} \pm 1\text{dB}$.

5.8 Bias current

When the voltage across R102, R202 is 3.3–3.8mV for Fe₂O₃ tape and 4.3–5.mV for CrO₂ tape, correct bias current is obtained, respectively. If the measured values are incorrect, adjust R149, R249 which give the correct performance.

6. LUBRICATION

Part	Oil	Details	
Reel shaft	Mitsubishi	Apply oil to contact surface between reel shaft and reel disc (60).	
Flywheel-capstan shaft/Adjusting screw hollow	Mitsubishi Molycoat	(1) Apply oil to contact surface between capstan shaft (36) and metal bearing. (2) Apply grease to end of capstan shaft and hollow of thrust adjusting screw (82).	
Idler assembly	Molycoat Mitsubishi	(1) Apply grease to idler shaft where friction spring contacts and slides. (2) Apply oil to contact surface between idler shafts and bearings.	
Supply reel disc	Molycoat	Apply grease to supply reel disc where back tension spring (29) contacts.	
Take-up reel disc	Mitsubishi	Apply oil to take-up reel disc where detect cam (31) contacts.	

Part	Oil	Details	
Pause assembly	Molycoat	(1) Apply grease to guide slot of lock lever and shaft. (2) Apply grease to change lever.	
Detect cam	Molycoat Mitsubishi	(1) Apply grease to the detect pin guide slot in detect cam (31). (2) Apply oil to detect cam where compression spring (30) contacts.	
Shut-off assembly	Silicone	(1) Apply grease to the worm and gear surfaces. (2) Apply grease to both ends of compression spring. (3) Apply grease in the slot through which lever and link are linked.	
Cassette door	Silicone	Apply grease to hinges of cassette door (150).	

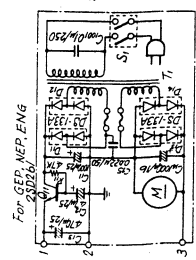
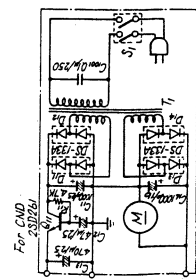
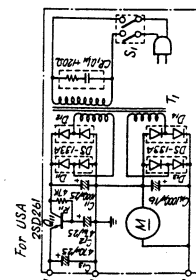
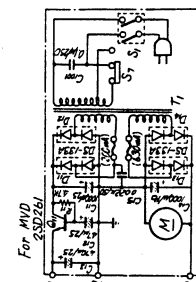
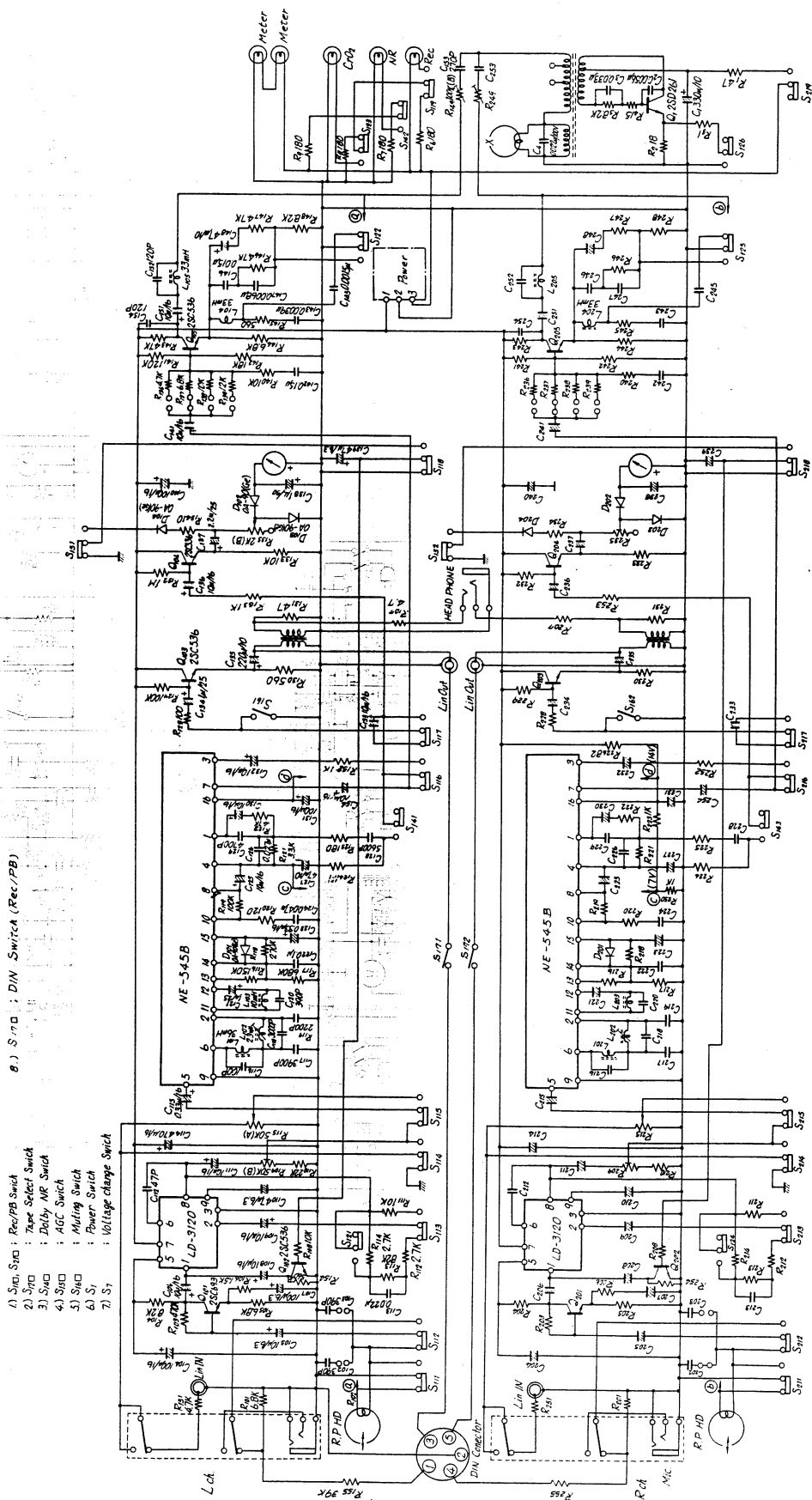
7. TROUBLESHOOTING

Symptom		Cause	Countermeasure
Motor does not turn.		1. Power cord defective. 2. Motor defective.	Replace. Replace.
Tape does not run.		1. Tension belt, motor pulley or pinch roller slipping due to oil or dirt. 2. Tension belt disengaged. 3. Motor pulley screws loose. 4. Pinch roller pressure insufficient.	Clean. Engage. Tighten. Adjust.
Rewind and/or fast forward impossible.		1. Reel disc tire, idler and/or flywheel slipping due to oil or dirt. 2. Friction of idler lever assembly insufficient. 3. Motor defective.	Clean. Adjust. Replace.
Wow and flutter excessive.		1. Tape speed unstable due to oil or dirt on pinch roller or capstan. 2. Oil or dirt on tension belt. 3. Pinch roller pressure insufficient. 4. Motor defective. 5. Bad tape.	Clean. Clean. Adjust. Replace. Use good tapes.
Unusual mechanical sound is produced.		1. Parts improperly fitted or fastened. 2. Lack of lubrication. 3. Motor defective. 4. Motor fan striking against something.	Check. Lubricate. Replace. Check and adjust.
Playback failure	No playback sound at all.	1. Record/playhead defective. 2. Power circuit defective. T1). If defective, replace. X1, DD11 DD13, DD14 or and, if defective, replace. 3. Lead wires of playback level control VRs disconnected. 4. Muting switch incorrectly adjusted. 5. Lead wires to LINE OUT and MIC jacks disconnected.	Replace. Check power transformer (T1). If defective, replace. Check Q11, DD11 DD12, DD13, DD14, C11 and C14, and, if defective, replace. Reconnect. Adjust. Reconnect.
Playback level control defective.	Playback sound level too low.	1. Transistors in the amplifier circuit defective. 2. Head out of alignment. 3. Dirt on head.	Check and replace. Adjust. Clean.
Recording impossible.		1. R136 – R139 (left channel) and R236 – R239 (right channel) disconnected. 2. Bias oscillator not working. 3. Record/play change-over switches S111 – 119 (left channel)/S211 – 219 (right channel) not working properly. 4. Lead wires to MIC jacks disconnected. 5. Lead wires to LINE IN or LINE OUT terminals disconnected. 6. Bias current insufficient.	Reconnect. Check Q1. Check T2 and erase head for disconnection. If defective, replace. Adjust. Reconnect. Reconnect. Adjust.

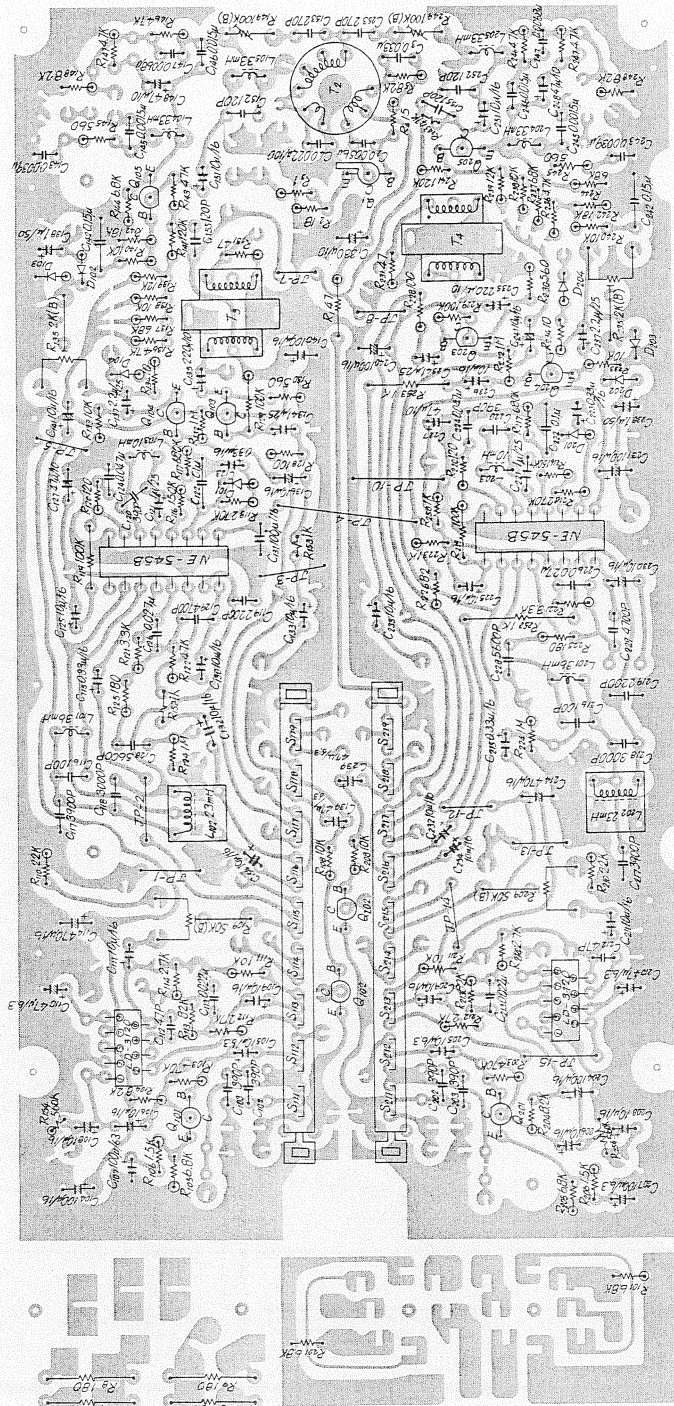
Sympton		Cause	Countermeasure
Erasing failure	No erasure at all.	1. Bias oscillator not working. 2. Lead wires of erase head disconnected. 3. Erase head internally disconnected.	Check Q1. Check T2 and erase head for disconnection. If defective, replace. Reconnect. Replace.
	Residual sound. ground. Fe2O3	1. Erase head or record/play head out of alignment. 2. Contact between tape and erase head insufficient. 3. Erasing current insufficient. (More than 70mA for Fe2O3 tape and more than 90mA for CrO2 tape. To measure, insert a resistor of 1 ohm between erase head and ground and measure the voltage across resistor. The voltage should be more than 70mV for Fe2O3 tape and more than 90mV for CrO2 tape.)	Adjust. Adjust. Check Q1, T2 and erase head. If defective, replace.
Lighting failure	All lamps not lighting. DC)	1. Power transformer internally disconnected. 2. Rectifying diodes DD13 and DD14 in the power circuit defective. (Power for lamps: 9 – 13V DC)	Replace. Replace.
	One or two lamps not lighting.	1. Lamp out of its holder. 2. Lead wires to lamp intermediate circuit board disconnected. 3. Lamp bulb burnt out.	Put it in place. Reconnect. Replace.
	Lamps not bright.	1. Incorrectly held in rubber holders. 2. Power voltage insufficient.	Put in place. Replace diodes DD13 and DD14.
	CrO2 indicator lamp not lighting.	1. Bulb burnt out. 2. Select lever spring incorrectly shaped.	Replace. Reshape.
	CrO2 indicator lamp not turning off.	Select lever not returning correctly.	Adjust.
Shut-off failure	Shut-off does not work or works intermittently.	1. Link allowance insufficient. 2. Contact of link with lead wires around jacks 3. Power is off during auto shut-off: button is released but lever does not return and button cannot be locked on next operation. 4. Coil spring badly positioned against detect cam.	Adjust stopper plate arm. Rearrange wires. Adjust leaf switch clearance. Adjust spring position.
	Shut-off works during FF or REW.	1. Top spring of detect cam making contact with brake plate. 2. Detect cam not following the reel disc rotation. 3. Coil spring badly positioned against detect cam.	Adjust clearance. Clean and oil detect cam. Increase compression spring force.
	Shut-off works at PAUSE	Detect cam spring incorrectly shaped.	Adjust and reshape.
Mechanical sound is recorded.		1. Link allowance insufficient. 2. Worm badly engaging with gear. 3. Tension pulley assembly defective.	Adjust. Replace worm. Replace or repair.

8. DRAWINGS

8.1 SCHEMATIC DIAGRAM

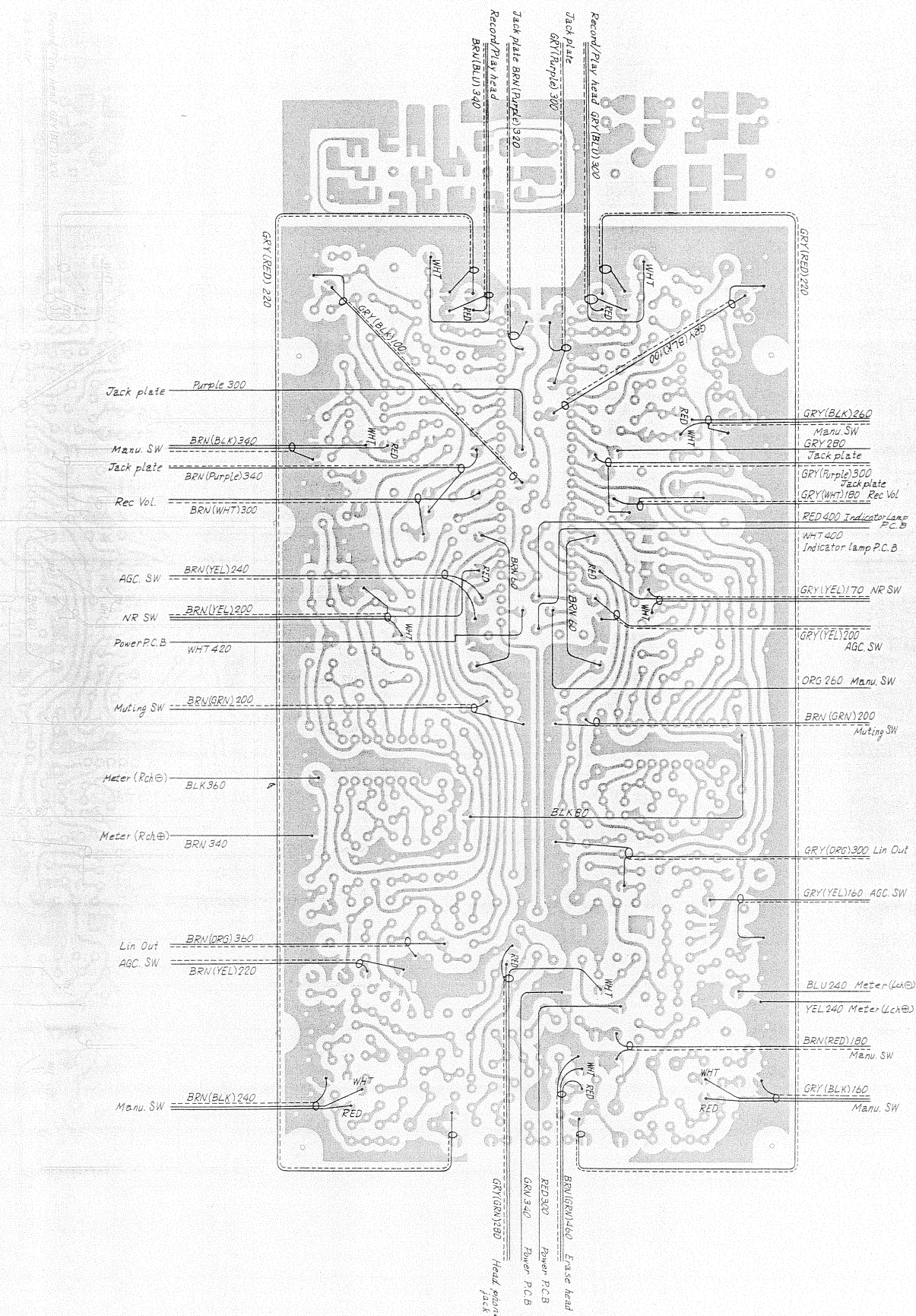


8.2 AMPLIFIER UNIT P.C.B.

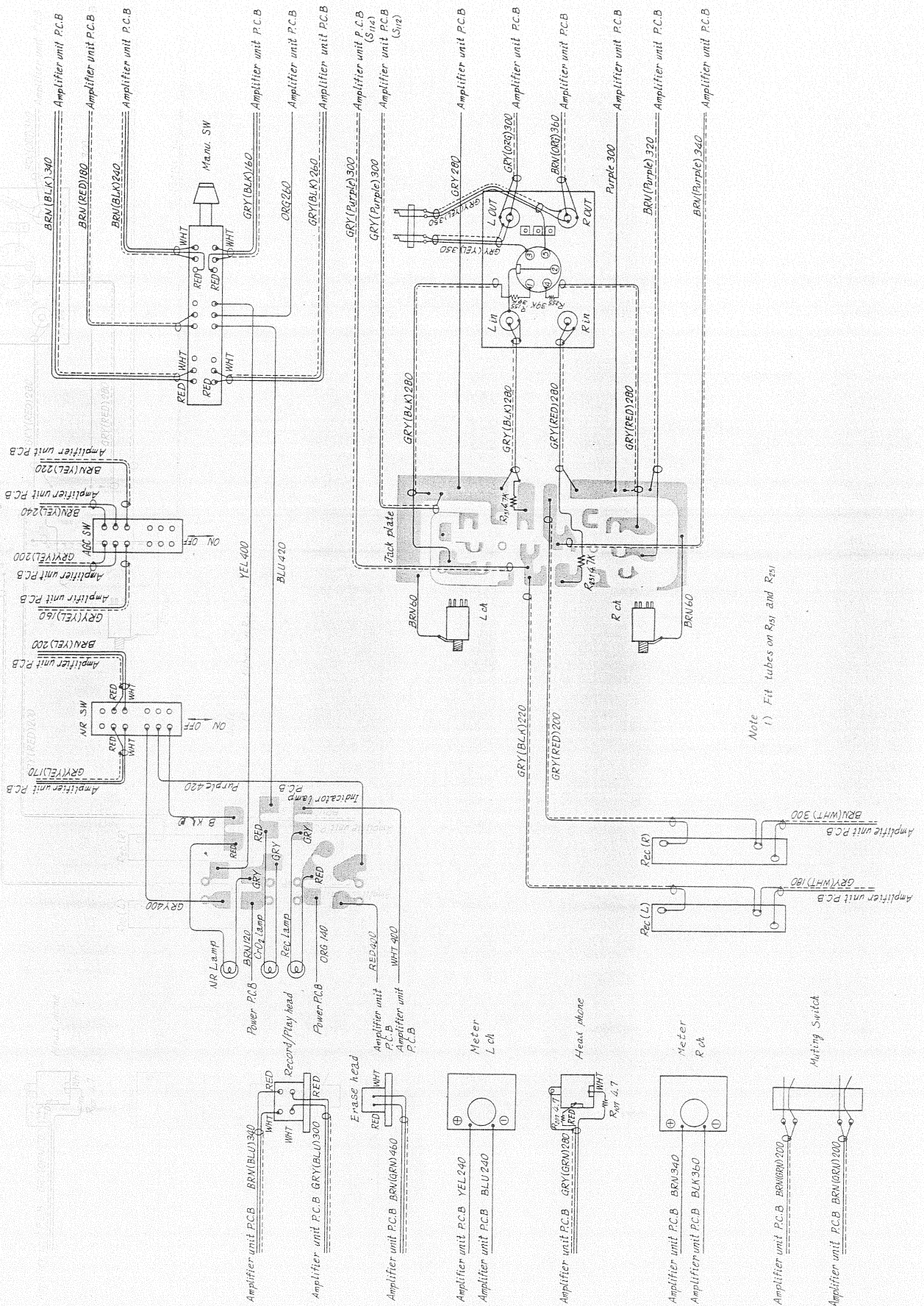


- 1) $L_{40.100}$ and $L_{40.100}$ should be mounted in the specified directions.
 Mark
 (The direction of the mark on the part should be the same as shown by "•" in the symbol.)
- 2) The mark "•" for $T_1, 4$ indicates the secondary side.

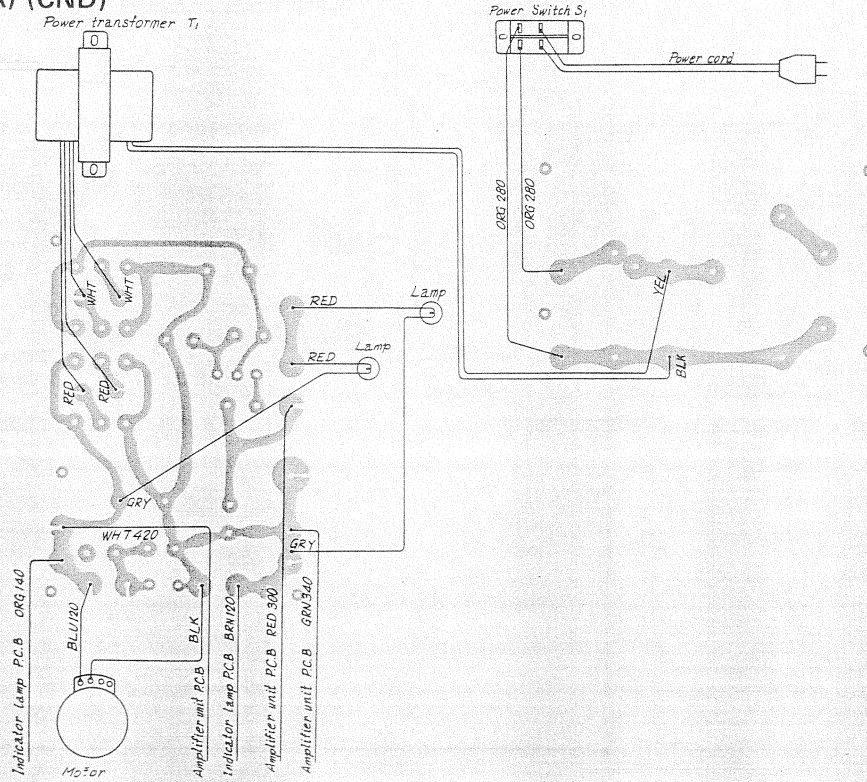
8.3 AMPLIFIER UNIT WIRING DIAGRAM



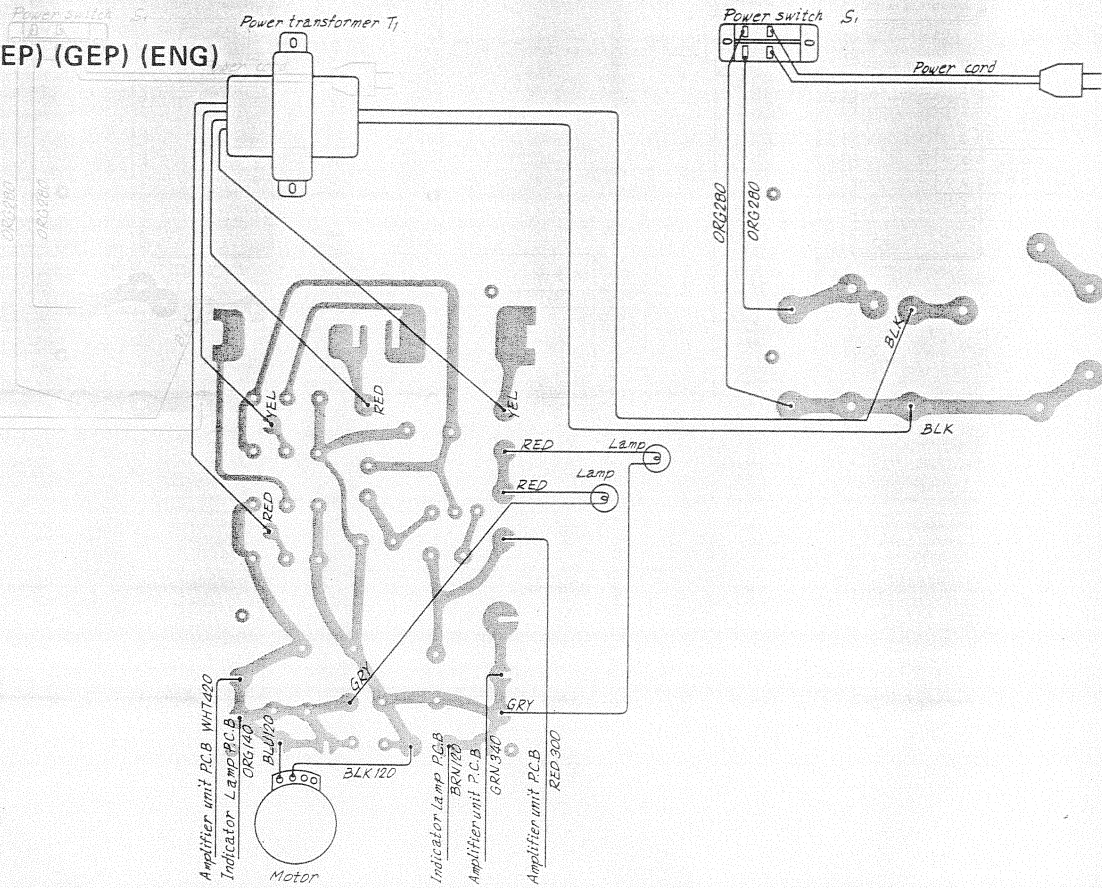
8.4 OVERALL WIRING DIAGRAM



8.5 POWER SECTION WIRING DIAGRAMS (USA) (CND)

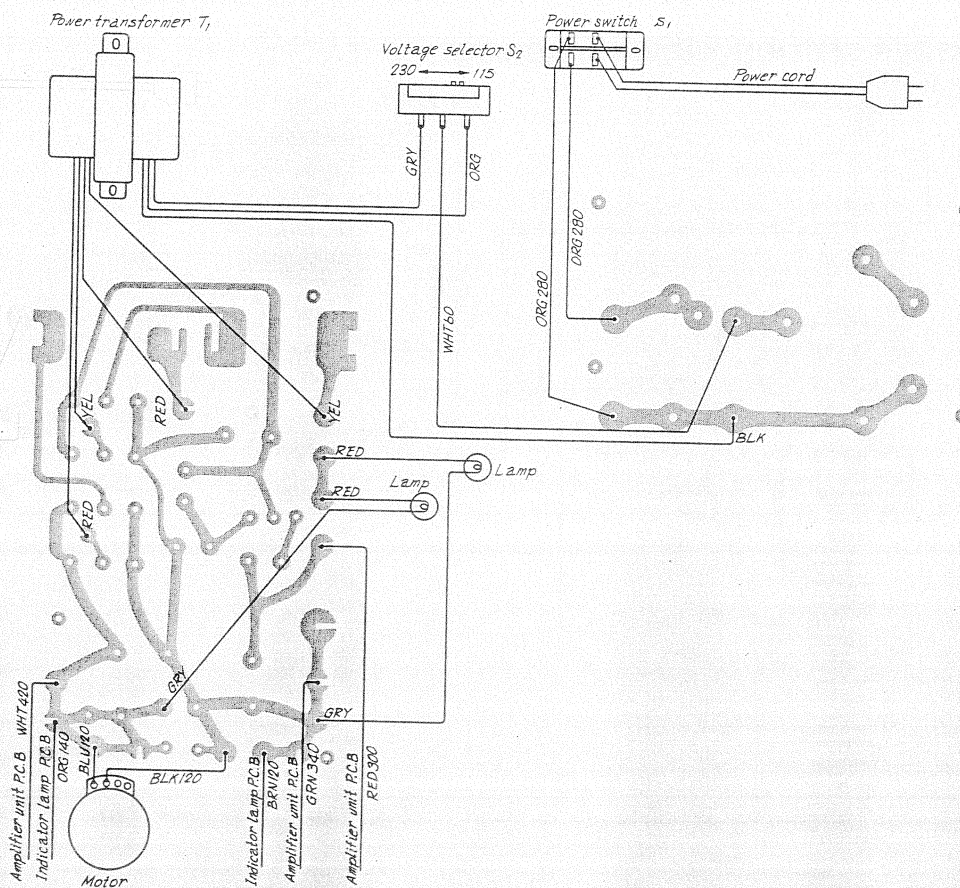


(NEP) (GEP) (ENG)



(Power section wiring diagram)

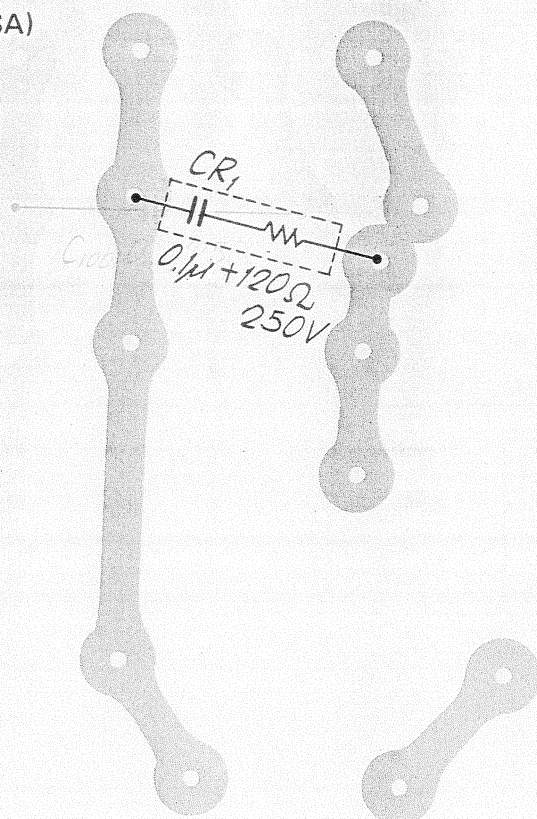
(MVD)



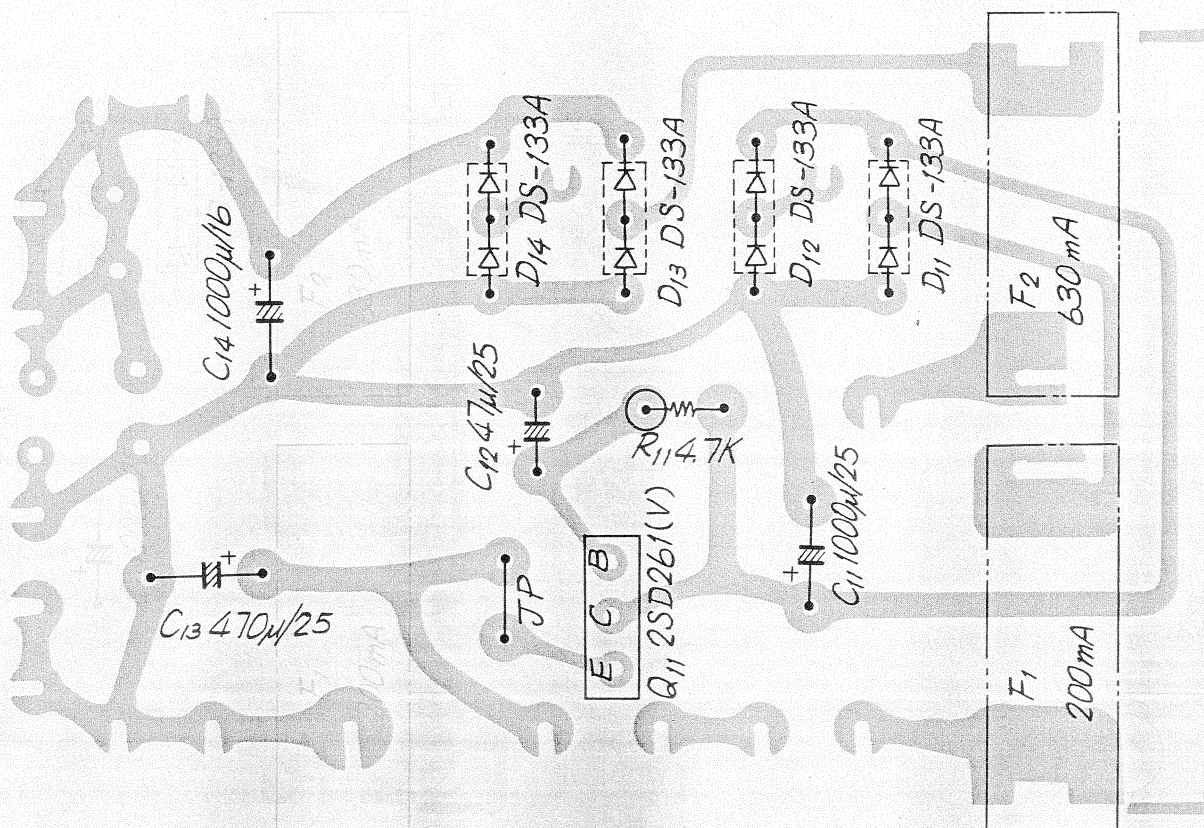
8.6 POWER INTERMEDIATE CIRCUIT BOARD
P.C.B. (Pattern side) (USA)

(VDE) (MVD) (NEP) (GEP) (CND)
(ENG)

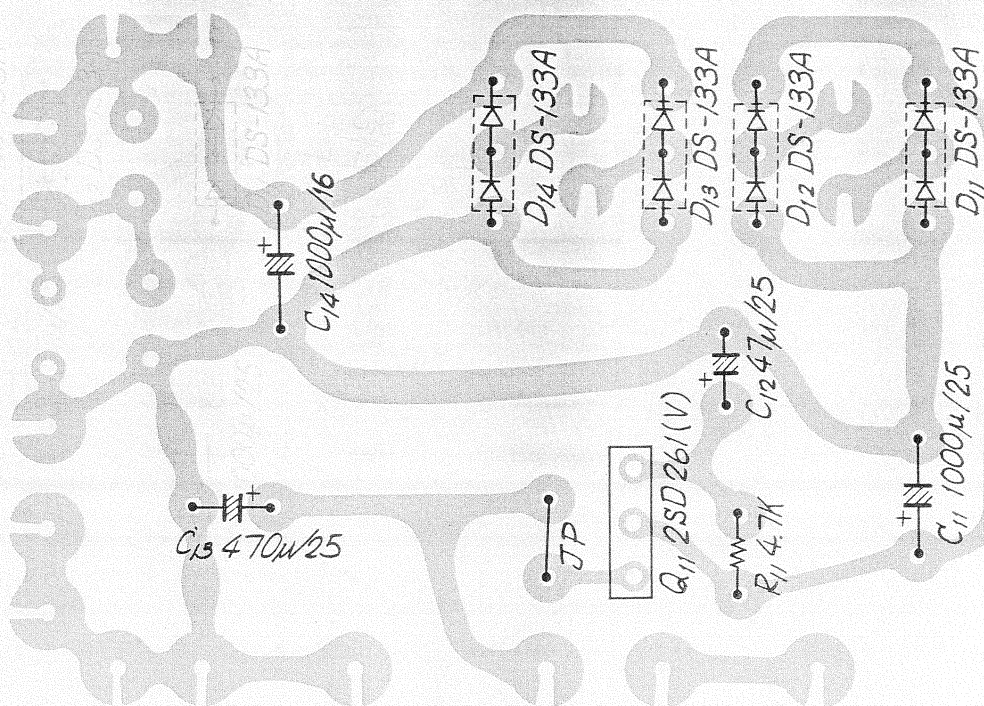
(USA)



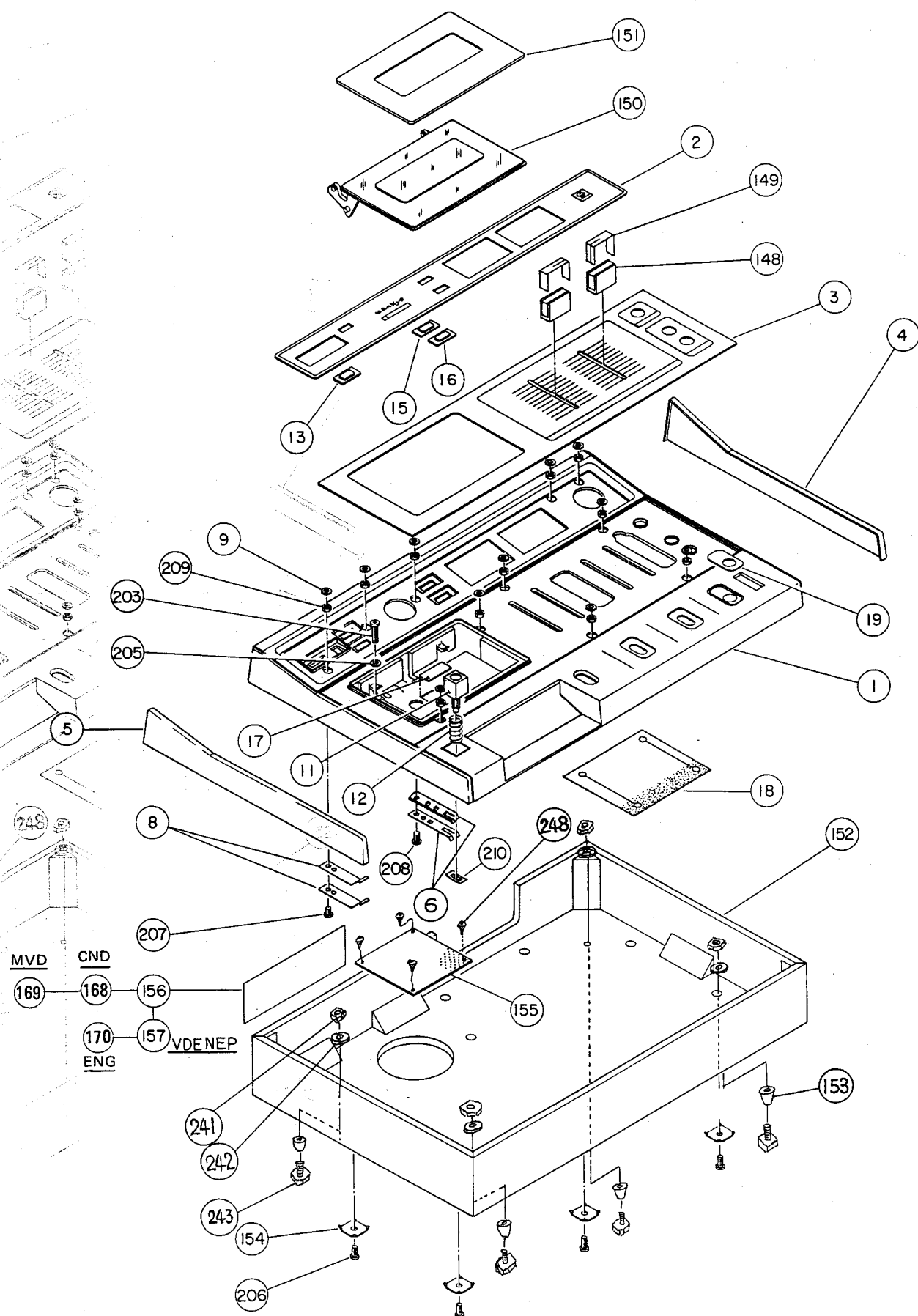
8.7 POWER CIRCUIT BOARD P.C.B. (Pattern side) (ENG) (MVD) (NEP) (GEP)

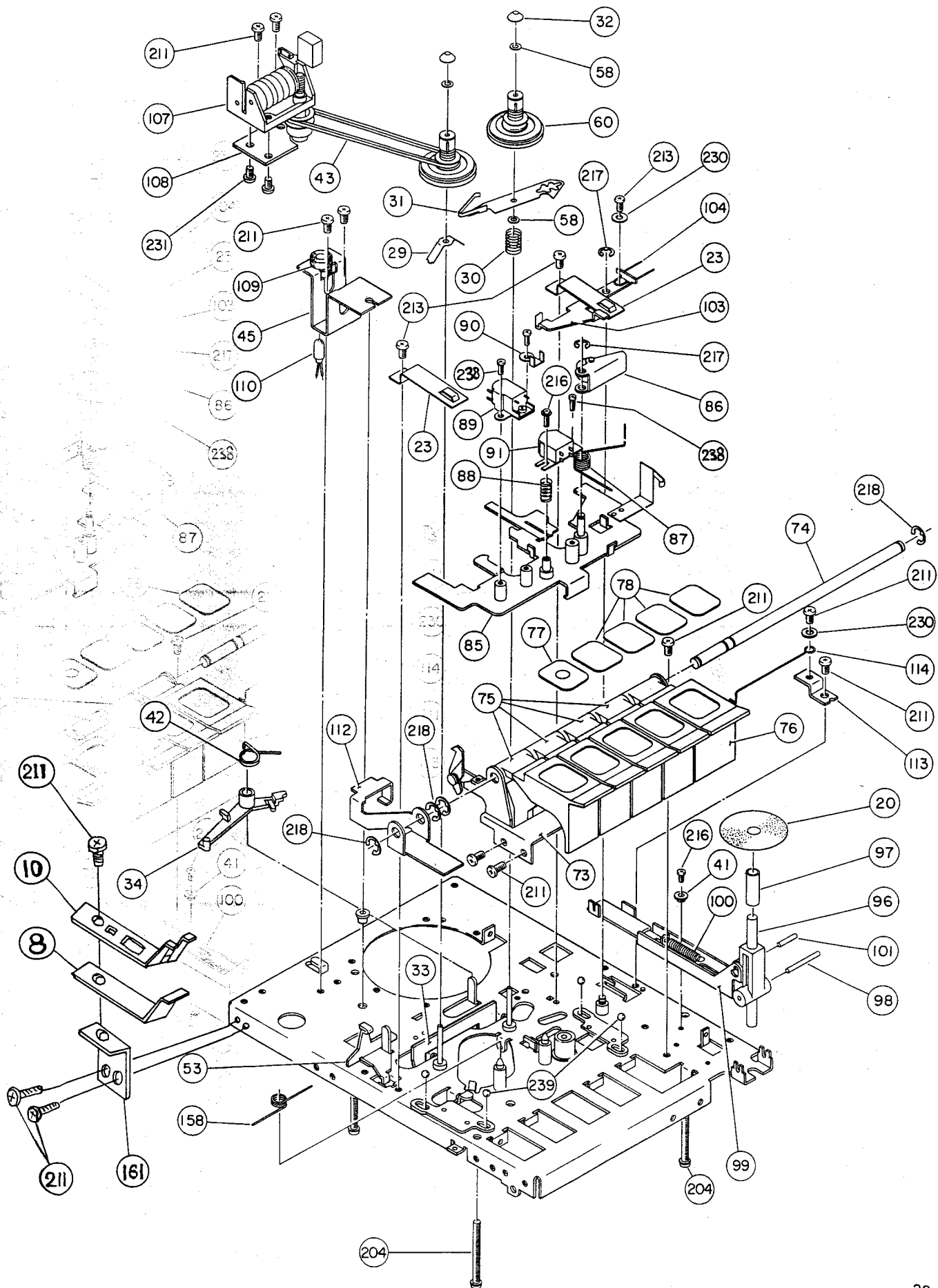


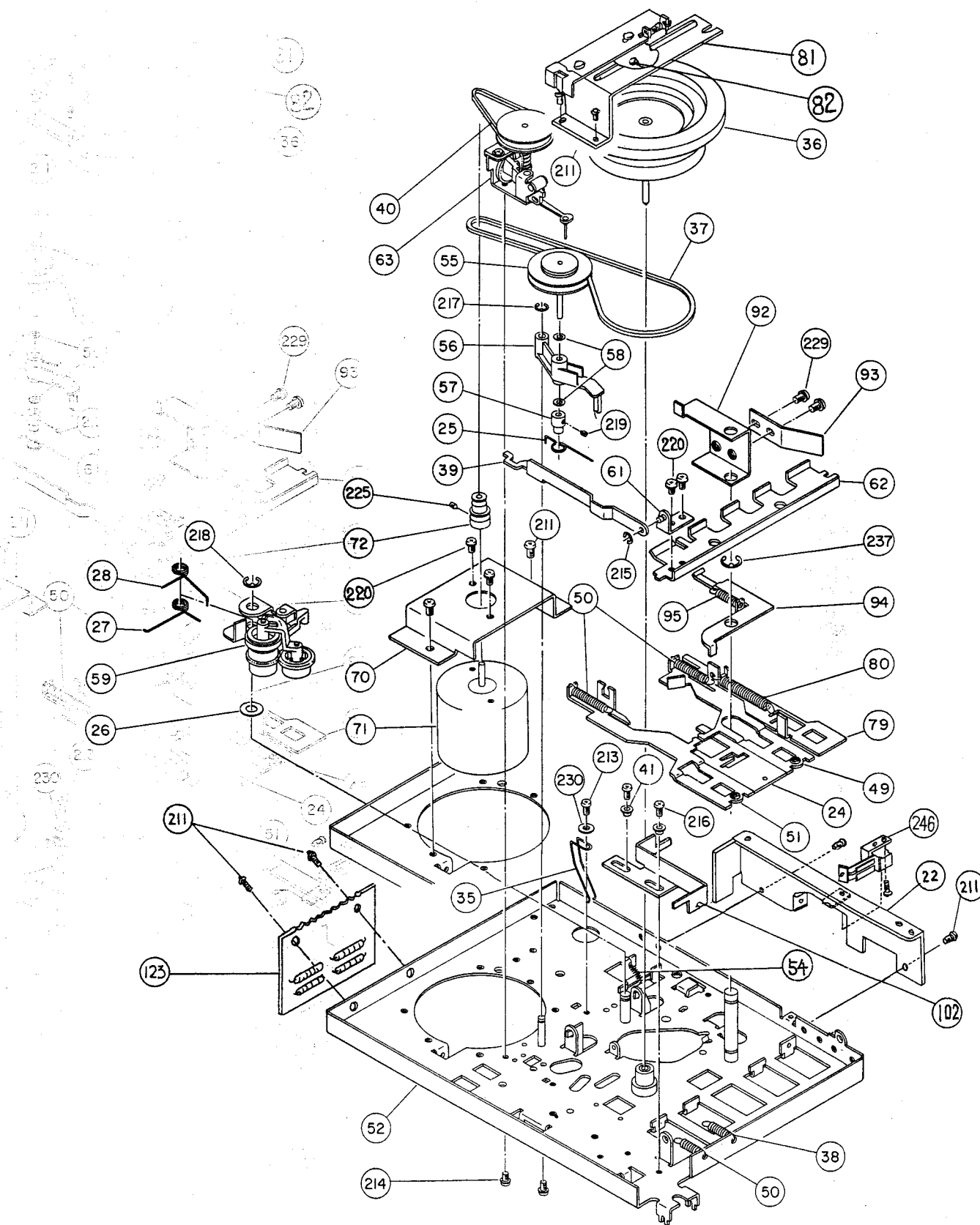
8.8 POWER P.C.B. (Pattern side) (USA) (CND)

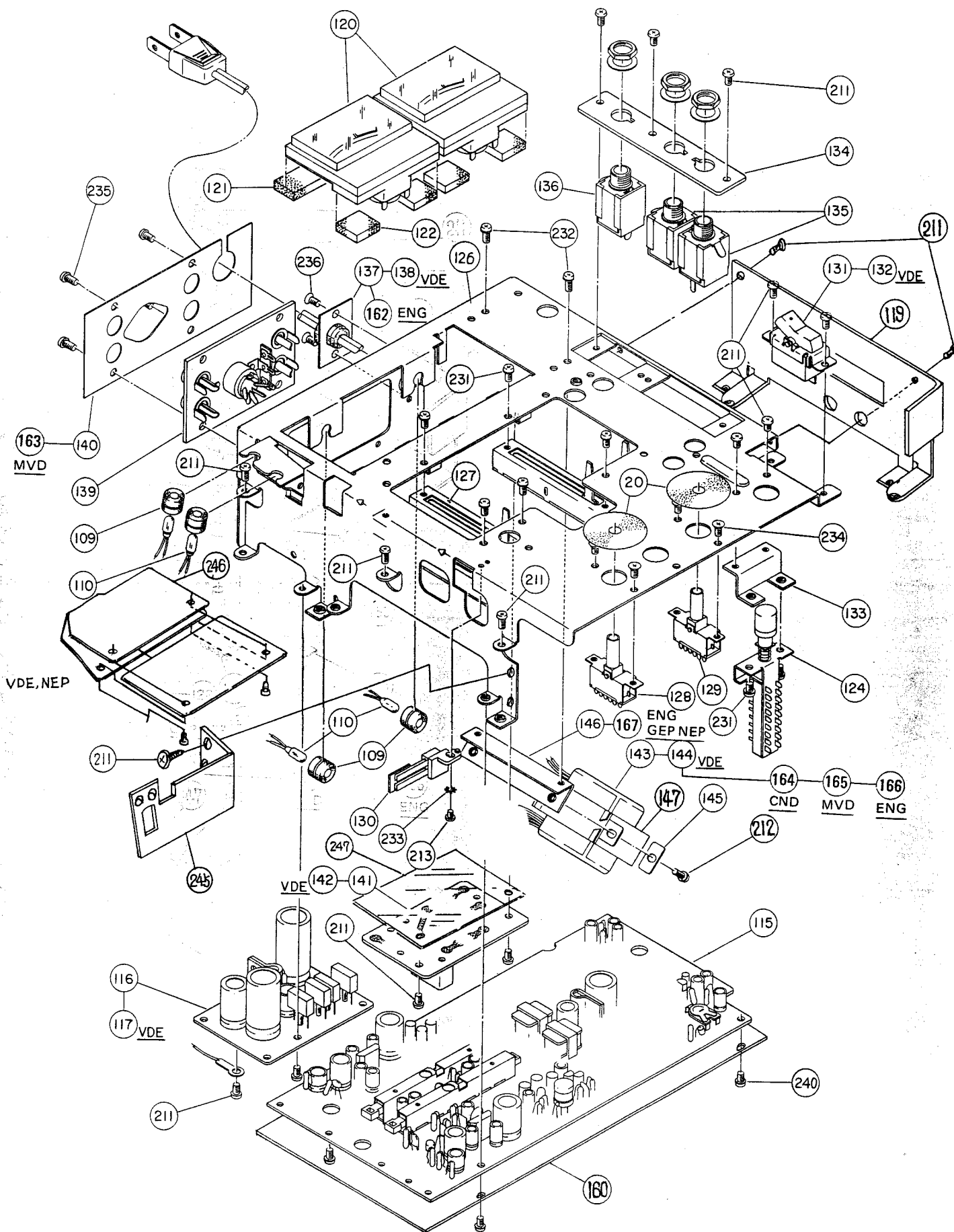


9. EXPLODED VIEWS









10. PARTS LIST

Drawing No.	Part No.	Part Name	For			Remarks
			UL	VDE	North European	
1	KGB 14676	Top casing	1	1	1	
2	KGD 55485	Front panel	1	1	1	
3	KGD 55486	"	1	1	1	
4	KGD 14682	Side panel	1	1	1	
5	KGD 14683	"	1	1	1	
6	KGE 55487	Spring	2	2	2	
8	KGE 14697	"	3	3	3	
9	KGE 14969	Washer	11	11	11	
10	KGE 95075	Spring	1	1	1	
11	KGE 14694	Button	1	1	1	
12	KGE 14968	Coil spring	1	1	1	
13	KGE 14687	Lamp window	1	1	1	
15	KGE 14971	"	1	1	1	
16	KGE 14972	"	1	1	1	
17	KGE 14802	Reflector	1	1	1	
18	KGE 95356	Volume cloth	1	1	1	
19	KGE 95078	Plate	1	1	1	
20	KGE 14693	Switch cloth	3	3	3	
22	KGD 96348	PCB holder	1	1	1	
23	KGE 13710	Head base plate clamp	2	2	2	
24	KGE 14643	Play plate	1	1	1	
25	KGE 13753	Tension arm spring	1	1	1	
26	KGE 7484	Washer	1	1	1	
27	KGE 13754	Idle spring	1	1	1	
28	KGE 14450	"	1	1	1	
29	KGE 14074	Tension spring	1	1	1	
30	KGE 97189	Coil spring	1	1	1	
31	KGE 14426	Detect cam	1	1	1	
32	PBE 11144	Reel cap	2	2	2	
33	KGE 14891	Brake	1	1	1	(or KGE 95134)
34	KGE 14050	Switch arm	1	1	1	
35	KGE 95074	Cassette holding spring	1	1	1	
36	KGE 07981	Flywheel capstan ass'y	1	1	1	
37	KGE 95081	Tension belt	1	1	1	
38	KGE 13759	Tension spring	1	1	1	
39	KGE 14107	Link	1	1	1	(or KGE 95117)
40	KGE 14705	Tension belt	1	1	1	
41	PBE 12018	Spacer	3	3	3	
42	KGE 96126	Switch lever spring	1	1	1	
43	KGE 14967	Tension belt	1	1	1	
45	KGE 14662	Bracket	1	1	1	
49	KGE 13707	FF plate	1	1	1	(or KGE 95472)
50	KGE 14449	Tension spring	3	3	3	
51	KGE 14635	Rew plate	1	1	1	
52	KGD 09314	Mechanism base plate ass'y	1	1	1	
53	KGE 13751	Lock prevention plate	1	1	1	
54	KGE 13757	Tension spring	1	1	1	
55	KGE 07583	Tension pulley ass'y	1	1	1	
56	KGE 07370	Tension arm ass'y	1	1	1	
57	KGE 7092	Pulley	1	1	1	
58	KGE 3111	Washer	4	4	4	

Drawing No.	Part No.	Part Name	For			Remarks
			UL	VDE	North European	
59	KGD 08760	Idle lever ass'y	1	1	1	
60	KGE 09420	Reel disk ass'y	2	2	2	
61	KGE 08344	Engagement arm	1	1	1	
62	KGE 95124	Button stoper	1	1	1	
63	KGD 08337	Auto stop mechanism ass'y	1	1	1	
70	KGE 55494	Motor bracket	1	1	1	
71	KGE 40860	Motor	1	1	1	
72	KGE 14894	Motor pulley	1	1	1	
73	KGE 07989	Lever holder ass'y	1	1	1	
74	KGE 14642	Rod	1	1	1	
75	KGE 14647	Lever	4	4	4	
76	KGE 14648	"	1	1	1	
77	KGE 14790	Lever plate	1	1	1	
78	KGE 14684	"	4	4	4	
79	KGE 14636	Rec plate	1	1	1	
80	KGE 13760	Tension spring	1	1	1	
81	KGE 08910	Thrust bracket ass'y	1	1	1	
82	KGE 14112	Thrust adjusting screw	1	1	1	(or KGE 95782)
85	KGE 08905	Head base plate ass'y	1	1	1	
86	KGE 08347	Pinch roller arm ass'y	1	1	1	
87	KGE 13755	Pinch roller arm spring	1	1	1	
88	KGE 3354	Coil spring	1	1	1	
89	KGE 40825	Erase head	1	1	1	
90	KGE 3505	Overall clamp	2	2	2	
91	KGE 40870	Record/playback head	1	1	1	
92	KGE 14667	Switch lever	1	1	1	
93	KGE 14666	"	1	1	1	
94	KGE 14654	Lock prevention plate	1	1	1	
95	KGE 3167	Tension spring	1	1	1	
96	KGE 14651	Lever	1	1	1	
97	KGE 14653	Lever pipe	1	1	1	
98	KGE 14656	Pin	1	1	1	
99	KGE 14649	Slide lever	1	1	1	
100	KGE 6760	Tension spring	1	1	1	
101	KGE 14655	Pin	1	1	1	
102	KGE 14650	Stop lever	1	1	1	
103	KGE 14644	Pause cam plate	1	1	1	
104	KGE 14640	Spring	2	2	2	
107	KGE 14754	Tape counter	1	1	1	
108	KGE 14663	Bracket	1	1	1	
109	KGE 10637	Bush	5	5	5	
110	KGE 95803	Pilot lamp	5	5	5	
112	KGE 14672	Eject lever	1	1	1	
113	KGE 14659	Bracket	1	1	1	
114	KGE 14675	Spring	1	1	1	
115	KGE 09547	Low frequency P.C.B.	1	1	1	
116	KGE 09501	Power supply P.C.B.	1	—	—	
117	KGE 09502	"	—	1	1	
119	KGD 96349	Bracket	1	1	1	
120	KGE 43097	Meter	2	2	2	
121	KGE 92408	Shock absorber	2	2	2	
122	KGE 3357	"	4	4	4	

Drawing No.	Part No.	Part Name	For			Remarks
			UL	VDE	North European	
123	KGE 09550	Lamp terminal P.C.B.	1	1	1	
124	KGE 42203	Push switch	1	1	1	
126	KGC 97222	Bracket	1	1	1	
127	KGE 20446	Slide volume	2	2	2	
128	KGE 42138	Lever switch	1	1	1	For Dolby For AGC
129	KGE 42137	Lever switch	1	1	1	
130	KGE 19115	Leaf switch	1	1	1	
131	KGE 42191	Power switch	1	—	—	
132	KGE 42141	"	—	1	1	
133	KGE 95072	Bracket	1	1	1	
134	KGE 14695	"	1	1	1	
135	KGE 42197	Mic. jack	2	2	2	
136	KGE 42198	Headphone jack	1	1	1	
137	KGE 08159	Power cord ass'y	1	—	—	
138	KGE 08608	"	—	1	1	
139	KGE 42201	Terminal	1	1	1	
140	KGE 14691	Terminal plate	1	1	1	
141	KGE 08540	Intermediate circuit board ass'y	1	—	—	
142	KGE 08312	"	—	1	1	
143	KGE 40821	Power transformer	1	—	—	
144	KGE 40857	"	—	1	1	
145	KGE 13799	Washer	2	2	2	
146	KGE 95073	Bracket	1	—	—	
147	KGE 95206	Shield	1	—	—	
148	KGE 95101	Knob	2	2	2	
149	KGE 95102	Plate	2	2	2	
150	KGD 14681	Cassette door	1	1	1	
151	KGE 95245	Plate	1	1	1	
152	KGD 14680	Cabinet	1	1	1	
153	KGE 96347	Foot	4	4	4	
154	KGE 14698	Washer	8	8	8	
155	KGE 14708	Net	1	1	1	
156	KGE 95244	Name plate	1	—	—	
157	KGE 95855	"	—	1	1	
158	KGE 95361	Head base plate return spring	1	1	1	
203	KGE 95137	+ P.H.T.S.	1	1	1	M3 x 12
204	19114	+ P.H.M.S.	3	3	3	M3 x 35
205	22146	Flat washer	1	1	1	3φ x 8φ x 1t
206	14314	+ P.H.M.S.	8	8	8	M4 x 10
207	19116	Knurled flange M.S.	1	1	1	M3 x 14
208	19048	"	1	1	1	M3 x 8
209	18082	Hexagonal nut	11	11	11	M3
210	18065	Push nut	1	1	1	M3
211	KGE 13601	+ P.H.T.S.	48	48	48	M3 x 5
212	19028	Knurled flange M.S.	2	2	2	M3 x 8
213	KGE 13599	"	5	5	5	M2.5 x 5
214	19034	+ P.H.M.S.	2	2	2	M2 x 4
215	22134	E-ring	1	1	1	E1.5
216	19036	+ P.H.M.S. with knurled flange	4	4	4	M2 x 6
217	22135	E-ring	4	4	4	E2
218	22147	"	9	9	9	E4
219	17033	Set screw	1	1	1	M1.7 x 3
220	19030	+ P.H.M.S.	4	4	4	M2.6 x 4
160	KGE 96517	AF shield plate	1	1	1	
161	KGE 95789	Bracket	1	1	1	

Drawing No.	Part No.	Part Name	For			Remarks
			UL	VDE	North European	
162	KGE 010123	Power cord ass'y	—	—	1	(For ENG)
163	KGE 95842	Terminal plate	1	—	—	(For MVD)
164	KGE 40822	Power transformer	1	—	—	(For CND)
165	KGE 40938	"	1	—	—	(For MVD)
166	KGE 49857	"	—	—	1	(For ENG)
167	KGE 95843	Bracket	—	1	1	
168	KGE 95952	Name plate	1	—	—	(For CND)
169	KGE 96021	"	1	—	—	(For MVD)
170	KGE 97114	"	—	—	1	(For ENG)
225	17009	Set screw	—	2	2	M2 x 5
229	19027	+ P.H.M.S.	2	2	2	M3 x 5
230	22137	Washer	2	2	2	M2.6
231	19015	+ P.H.M.S.	8	8	8	M3 x 5
232	19016	"	4	4	4	M3 x 6
233	22063	Tooth washer	1	1	1	
234	14722	+ F.H.M.S.	4	4	4	
235	KGE 13602	+ F.H.T.S.	4	6	6	
236	KGE 95095	"	2	2	2	
237	22205	E-ring	1	1	1	
238	19077	+ P.H.M.S. with spring	3	3	3	M2 x 6
239	54004	Steel ball	4	4	4	
240	19083	+ P.H.M.S.	4	4	4	M3 x 6
240	19046	+ P.H.M.S. with spring	2	2	2	M3 x 8
241	18092	Nut	4	4	4	M4
242	22149	Washer	4	4	4	φ4.5
243	12009	Bolt	4	4	4	M4
244	KGE 42252	Leaf switch	1	1	1	
245	KGE 96344	Bracket	1	1	1	
246	KGE 96745	Protector leaflet	—	1	1	
247	KGE 95844	Insulating plate	1	—	—	
248	16029	Screw	4	4	4	

+ P.H.M.S. = Cross recessed pan head machine screw
 + P.H.T.S. = Cross recessed pan head tapping screw
 + F.H.M.S. = Cross recessed flat head machine screw
 P.C.B. = Printed circuit board